



Faculty of Education

Enhancing an understanding of the pedagogical needs of culturally and linguistically diverse adult TAFE students

Frederick Wright.

B.A. (Swinburne); Grad. Dip. Ed. (Melb), Grad.Dip. Careers (Deakin); Grad. Dip. P.Ed. Rec for Disabled (Deakin); Grad. Dip. Psych (Monash); Master. Ed Psych (Melb).

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Abstract

The Australian education system has a recent history of recruiting significant numbers of international and migrant students whose first language is not English to study in Australian Technical and Further Education (TAFE) colleges. Many of these international and migrant students have come from Asian countries with different learning styles and cultural expectations associated with study and education. Although TAFE administrators have been keen to encourage Culturally and Linguistically Diverse (CALD) full-fee paying students and local migrant students to study at Australian TAFE, there is some evidence that often only limited classroom based pedagogy adaptations are made for these students. The expectation is that CALD students will assimilate into the educational teaching and learning practices offered by TAFE. These TAFE courses have typically been designed for Australian students with proficient English language skills in writing, listening and comprehension. At the core of this research are two issues: (1) What are the learning styles of CALD students? and (2) How can TAFE teachers adapt their pedagogical practices to more effectively accommodate CALD students in their classrooms?

The current study has been informed by Vygotsky's (1978) socio-cultural theory of cognitive development. The participants were CALD students who attended two large urban TAFE colleges and their teachers. The research is made up of three connected studies that investigated; (1) the perceptions CALD TAFE students have of their learning styles and problem-solving techniques; (2) the perceptions TAFE teachers have of their CALD students as learners and problem-solvers; and, (3) the effectiveness of Marion Blank's (2002) dialogue and cognitive processing strategies as a pedagogical intervention to enhance the learning of CALD TAFE students. The underlying theoretical linkage across these three studies is the notion that cognition, thinking, memory and language are

closely related and interact in a dynamic interchange. This notion draws on Vygotsky's (1978) theory of cognitive development and Baddeley's (2004) memory research. In a second-language learning and communication environment, there are more memory capacity demands placed on the CALD individual. This can influence the person's speed of memory processing into the long-term memory as the person's first language interferes with the individual's ability to think and operate easily within the second language context. In these situations TAFE teachers need to adapt their language of instruction to better accommodate the CALD students who typically have more limited vocabulary knowledge, working in the second language context and are less likely initially to link quickly new information and concepts to their established conceptual knowledge of the topic being taught.

In terms of the first study a cohort of 81 (52 female and 29 males) TAFE CALD students were administered the *Preferred Learning Style Questionnaire* (PLSQ) (Singelis, Triandis, Bhawuk & Gelford, 1995), and the *Preferred Way of Problem Solving* survey (PWPS) (Güss & Wiley, 2007). Based on a Rasch analysis of the students' surveyed responses it was identified that CALD students' perceptions of themselves as problem-solvers showed similar patterns for dealing with practical and interpersonal tasks and problems in an Australian setting, but it was also demonstrated that these students were not able to endorse the usefulness of their problem-solving strategies in study conditions in an Australian educational setting. It was also shown that the students preferred a collectivist approach to study, but were also interested in their individual performance as students. The length of time in living in another country also contributed to the CALD students' confidence to problem-solve in a culture and language different from their home one.

The second study investigated the perceptions TAFE teachers had of their CALD students as learners and problem-solvers. This investigation was completed using an eight item survey based on Marion Blank's (2002) four levels of dialogue and cognitive processing. The four levels are: Level 1 – description, Level 2 – comparison, Level 3 – self-reflection and generalisation, and Level 4 – abstract reasoning. The TAFE teachers identified that the CALD students they had taught typically operated more at the lower levels and that these students had more difficulty with self-reflection, generalisation and abstract reasoning in an Australian educational setting.

Overall, the TAFE CALD students' responses and the TAFE teachers' perceptions of CALD students' supported the argument that language proficiency and cultural knowledge influenced the potential of individuals to function effectively with higher order cognitive issues when they operated in a different cultural and language environment to that which they had come from.

In study 3 the aim was to investigate an intervention to ameliorate the problems identified in studies 1 and 2. This intervention involved "teaching" three TAFE teachers who taught classes involving significant numbers of CALD students, how to adapt their teaching so that their instructional interactions used all four of Marion Blank's Levels of Questioning (2002). Teachers reported that the CALD students' behaviour in class changed after the intervention, with the students being more active in the classroom activities, asking questions, and clarifying assessment tasks. It was reported that there were significant differences in CALD students' understanding of what was required of them to complete assessment tasks successfully and structure their written material. In addition, interview feedback from the participating teachers and a survey of the CALD students indicated that they were supportive of the intervention.

The findings are discussed in terms of the need for TAFE to develop a stronger pedagogy of instruction for CALD students, and the implications of the findings to socio-cultural theories of cognitive development and educational practice, particularly in the adult learning domain and with students from diverse backgrounds.

CERTIFICATION

This thesis contains no material which has been accepted for a degree or diploma by the University or any other institution, except by way of background information and duly acknowledged in the thesis, and to the best of my knowledge and belief no material previously published or written by another person except where due acknowledgement is made in the text of the thesis, nor does the thesis contain any material that infringes copyright.

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Publications

- Hay, I. Callingham, R., & Wright, F. (2013). Social learning, language, and instruction for adult learners where English is their second language. In S. Phillipson., K.Y.L. Ku., & S.N. Phillipson (Ed's), *Constructing educational achievement: A sociocultural perspective* (pp. 148-160). London: Routledge.
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Chapter 1: Introduction

This study directly addresses the situation faced by many Culturally and Linguistically Diverse (CALD) students who have a knowledge of formal English vocabulary and sentence construction, but find it difficult to comprehend the implicit meaning often embedded in Australian spoken English. Within this dissertation, the terms, L2 for second language learners, and CALD, for Culturally and Linguistically Diverse students are both used because there are different traditions in the research literature, with the term CALD evolving more from the recent sociology research literature and the term L2 from the linguistic research framework. The terms CALD and L2 are used interchangeably, and where researchers have focused on one term or another, the term used by those researchers is maintained. In this dissertation, adult students from a non-English speaking country are likely to be both CALD students and English L2 students. It is noted that the term EAL has also been used in the literature for English as an additional language (EAL) and this term has also been used in places to acknowledge that for many CALD students, English may be their third or fourth language.

The following vignette is provided to place the study in a context. A psychologist who worked as a student counsellor at a large tertiary institution wondered why many CALD students were attempting to meet with him without an appointment. The service had always operated on an appointment only basis. At the end of a counselling session it was the counsellor's habit to close the meeting and say "Come back anytime". The counsellor was using this term in the colloquial sense to indicate openness, but the CALD students were understanding the statement in a literal sense and assuming that they did not need to make an appointment.

Zhonggang Gao (2001) stated that grammar is critical in the teaching and learning of a second language (L2) viewed from Vygotsky's (1978) socio-cultural theory (SCT) perspective; however, language and effective communication have embedded levels of cognitive complexity that go beyond vocabulary (Hatano & Wertsch, 2001). The context in which the use of language takes place impacts on the capacity of both the communicator and the receiver to understand the exchange. As Culcatta, Blank and Black (2010) have noted "there is more to literacy than decoding words and sentences" (p. 308).

Communication can be seen as an interplay between the communicator and the receiver at different levels of complexity. Where communication systems are linked to professions with a specialised vocabulary, potentially different meaning systems may be embedded in the contexts which can cause difficulties for native speakers, and create major problems for students of CALD backgrounds. This situation applies particularly to international and migrant students who might be studying new material that has complicated technical vocabulary in a second language (Huang & Brown, 2009; Murray, 2010).

Learning a language is an essential human activity and understanding that language and how its grammar and vocabulary are constructed provides the foundation upon which meaningful communication between individuals and others occurs. Blank, Gessner and Esposito (1979) pointed out communication is not always easy and the pragmatics of a language often involves the capacity of an individual to interpret the underlying complexity and meaning of messages that are embedded in a communication. Blank et al. (1979) identified two levels of language development; one, in the formal understanding of the language system: syntax and semantics; and second, the acknowledged importance of socio-interpersonal pragmatics in the communication.

One aim of this study was to investigate the capacity of CALD students to interpret the underlying complexity and meaning of messages that are provided to them by their Technical and Further Education (TAFE) instructors. This population of students comprises international students in Australia, and migrant students who were learning English or training in a specific TAFE course. There has been little research into how this population of students see themselves as learners in an Australian vocational education setting or how TAFE teachers can adapt their instructional pedagogy to better accommodate these students. Specifically, the study addresses how CALD students perceive themselves as learners and how their teachers perceived them as learners in an Australian TAFE classroom, and how their teachers can adapt their language of instructional to these students. This study is based on the notion that language is a cognitive tool that is vital in organising people's thoughts and comprehending meaning from the spoken words (Hatano & Wertsch, 2001). When adult CALD students are faced with learning in a linguistic and culturally different setting, prior language processing and knowledge could be affected.

List of definitions:

The following terms and definitions are used in this study.

Culturally and Linguistically Diverse (CALD) students: People from any area that has different cultural traditions from the host country and who also speak a first language that differs from that of the host.

International students: Students who study in Australia, but come from another country.

International English Language Test Score (IELTS): A recognised test of English language proficiency. According to the IELTS Institute (2011), the IELTS is a globally used approach to assessing the English language proficiency of people who speak English as a second language. It is claimed that the system assesses spoken, written and pragmatic language under conditions that include conversational English and academic English. The assessment procedure provides a band score from one to nine. The following are descriptions of the nine levels of the IELTS band:

Table 1.1

Description of the IELTS assessment band for English language proficiency (IELTS, 2011)

IELTS Band	Description of Band level
Band 9	Expert user – complete understanding
Band 8	Very good user – misunderstandings might occur in unfamiliar situations
Band 7	Good user – generally handles complex language and understands detailed reasoning
Band 6	Competent user – can use and understand fairly complex language, particularly in familiar situations.
Band 5	Modest user – coping with overall meaning in most situations
Band 4	Limited user – basic competence is limited to familiar situations
Band 3	Extremely limited user – conveys and understands general meaning communication is possible
Band 2	Intermittent user – no real communication, great difficulty with written and spoken communication
Band 1	Non-user

English as a Second Language (ESL): A term used to describe non-native speaking students who are learning English.

L1: First language of a person

L2: Second language of a person

The Technical and Further Education Sector (TAFE)

The TAFE sector is an Australian state government-funded sector that provides Vocational Education and Training (VET) programs to students in their late teens through to mature adults. The terms VET and TAFE are used as interchangeable terms in this document because Technical and Further Education colleges are Vocational Education and Training colleges. TAFE colleges as VET colleges provide courses of study that prepare students for practical and para-professional employment, such as in the building trades, office administration, and professional and support work in the caring professions, such as disability care, child care, or aged care. The two large Australian metropolitan TAFE institutions used in the current study were founded in the 1980's and have expanded their respective programs over the years. Currently, they provide programs that begin at Certificate level, expanding to Diploma and Degree levels. Certificate programs focus on training students for vocational activities such as apprenticeships, whereas Diploma level and above programs introduce students to greater technical detail and theory related to the area of study. Programs are located onshore and overseas, and there are also programs delivered in conjunction with universities. The Australian and Victorian VET sector is made up of government-funded TAFE colleges and private companies that provide vocational education.

The two TAFE institutes used in the study had a combined enrolment of students of around 90,000. The programs that were run in each of these institutions had many similarities, but there were also particular specialist areas that each of the institutes taught. One of the TAFE colleges specialised in the teaching of horticultural trade subjects and degree programs in Nursing and Early Childhood Education, while the other TAFE had automotive training for apprentices and degrees in areas related to the music industry. Instruction in areas such as hospitality, business studies, adult education courses, child care,

information technology, social sciences, and language programs were common to both TAFEs.

English language students

Language programs for both migrant and international students are run at both of the TAFE institutes used in this research. These language programs start at a basic level for students with little or no English background through to advanced language programs for migrants who are professionals' wishing to reach English proficiency so they can qualify to work in their respective industries in Australia. Language programs for international students focus on instructing the students to the level required for entry into the mainstream programs of their choice. Although migrant students often enter programs paying fees based on their being residents in Australia, international students are required to pay full fees for any program they enter.

To be able to enter a mainstream program a student must provide evidence of adequate English proficiency. A student's level of English can be determined by examination results in English proficiency at Year 12 level, matriculation, A-level or O-level. A student might also show adequate English proficiency by completing a language test such as the IELTS, TOEFL, ISLPR, Pearson or Cambridge tests (Holmesglen, 2011). Each of these tests is designed to assess the English language proficiency of people of non-English speaking backgrounds. Students who are not able to demonstrate adequate English proficiency are required to complete an English language program. English language entry requirements vary depending on the program the student wishes to enter; for example, trade programs require Year 11 studies to have been completed and a lower level of English than do higher education areas. The English language proficiency required for a course is dependent on, whether it is a Certificate, Diploma or Degree program. Local migrant students are encouraged to reach an adequate English language level before entering any mainstream program (Holmesglen, 2011).

International students can select from a range of programs they might wish to study in, but they are not able to enter all programs offered by the institutions. International students are able to do studies in trade areas such as bricklaying, carpentry, and painting. The language proficiency for these programs requires an IELTS score of 5.5 and the programs cost around \$11,500 for a one year program. International students are also able to enter Certificate IV programs in areas such as Fashion Design or Interior Decorating.

These courses are six months (cost=\$5,650) and twelve months (cost= \$11,300) respectively. At the Certificate level these programs require an IELTS score of 5.5. , Diploma level programs such as Welfare are two years in length and require an IELTS English proficiency score of 5.5 minimum in listening, speaking, reading and writing. The degree programs vary between an IELTS score of 6 or 7 for entry into the program. A Bachelor of Information Technology course requires an IELTS English proficiency score of 6, while the Bachelor of Early Childhood Education requires an IELTS English proficiency score of 7. Between the two institutes the number of students of CALD background either learning onshore or overseas, was about 15,000 students.

CALD students' participation in the VET sector

The Vocational Education and Training (VET) sector had an 85% increase in the number of CALD students attending TAFE in Victoria between 1999 and 2008 (Victorian Government, 2009). In 2009, 20% of students enrolled in VET sector courses were of CALD background. Between 2009 and 2011, however, there was a reported decline in the number of international students applying for a VET sector student visa. The Australian Bureau of Statistics (2011) reported a 37% drop in the number of international students applying for a VET sector student visa. Holmesglen Institute of TAFE was reported to have been the largest provider of education to international students in the TAFE sector, with a CALD students making up around 16% of its student population (Australian Bureau of Statistics, 2011).

In Australia since 2005, there has been a major expansion in the number of vocational education and training (VET) international students of which 85% of these international students were from Asia (Tran & Nyland, 2013). In terms of the financial importance of this market to Australia, international students contributed \$990 million to the South Australian economy (Australian Bureau of Statistics, 2010) and made up 34% of service exports and earnings for the Victorian economy in 2010 (City of Melbourne, 2010). In total, the international student market made up 7.2% of the total national economy in 2009 (Australian Bureau of Statistics, 2010). Over 80% of international students study in Higher Education and the VET sector (Australian Bureau of Statistics, 2011). Hence, the VET sector is an important contributor to the Australian economy and it is in the national interest to the Australian economy that international students experience success.

Although VET administrators have been keen to encourage Culturally and Linguistically Diverse (CALD) full-fee paying students to study in Australia, there is evidence that only limited pedagogical accommodations are made for these students (Marginson, 2007; Smith, 2010; Tran, 2011). The expectation is that CALD students will assimilate into the educational teaching and learning practices associated with their VET studies, which typically have been designed for Australian students with proficient English language skills in writing, listening and comprehension. In particular, Marginson (2007) and Tran and Nyland (2013) have argued that the Australian VET sector needs to change from a Western ethnocentric curriculum to a more internationalised curriculum, and a VET curriculum that used a curriculum framework that was more supportive, flexible, adaptive and responsive to international students. An internationalised curriculum is considered one that at least includes, as a normal part of its program, international examples, case studies and knowledge and professional practices selected from a global context into the VET teaching and learning practices (Hellsten, 2008; Marginson, 2007; Tran, 2011).

The Australian VET sector appears to have a poor understanding of international students' often complex learning characteristics, and their divergent and shifting study purposes, and there seems to be significant tension within the VET sector between the need for a more learner-centred pedagogy for the international students and the VET sector's demands for compliance and commodification of its VET courses (Tran & Nyland, 2013).

Concerns about the need for a more learner-centred pedagogy for international students is starting to be more recognised in the VET sector, with TAFE Directors Australia (2011, p i) stating "that across the 58 TAFE institute network, TAFE Directors Australia were committed to the highest quality of education provision for the 25,000 international students enrolled in TAFE". They also called for more research and more opportunities to "share good practice" across the industry and to learn from each other's experiences. The need for TAFE Australia to enhance its pedagogical knowledge and practices, and to have a better understanding of the learning needs and styles of its international students, has also been articulated by Tran (2011) and Smith (2010). Both of these researchers have stated that gaining this knowledge is essential if the Australian VET sector was going to fulfil its ethical commitment and legal obligations in ensuring that a

high-quality and an internationally relevant education was provided to international students.

At the core of this research are two issues: (1) What are the learning styles of CALD students? and (2) How can TAFE teachers adapt their pedagogical practices to accommodate CALD students more effectively in their classrooms?

One aim of this study is to consider the difficulties of CALD students who were learning at Certificate 1V and Diploma level in the Technical and Further Education (TAFE) sector in Australia. This population of students comprised international students in Australia and migrant students who were learning English or training in a specific TAFE course. There has been little research into how this population of students see themselves as learners in an Australian vocational education setting. Specifically, the study addressed how CALD students perceive themselves and how their teachers perceived them as problem-solvers in an Australian classroom. Individualist and collectivist learning styles were investigated to determine if any differences in learning styles could contribute to problem-solving approaches used in a TAFE classroom. Because language is a cognitive tool that is vital in organising people's thoughts during problem-solving (Hatano & Wertsch, 2001), when adult CALD students are faced with learning in a linguistic and culturally different setting, prior problem-solving knowledge could be affected. An intervention to help CALD students based on the use of structured questions (Blank, Rose & Berlin, 1978) was undertaken in three TAFE classrooms.

Research questions

The underlying theoretical linkage across these three studies is the notion that cognition, thinking, memory and language are closely related and interact in a dynamic interchange. This notion draws on Vygotsky's (1978) theory of cognitive development and Baddeley's (2004) memory research. In a second-language learning and communication environment, there are more memory capacity demands placed on the CALD individual. This can influence the person's speed of memory processing into long-term memory as the person's first language interferes with the individual's ability to think and operate easily within the second language context. In these situations TAFE teachers need to adapt their language of instruction to better accommodate the CALD students who typically have more limited vocabulary knowledge, working in the second language context and are less

likely initially to link quickly new information and concepts to their established conceptual knowledge of the topic being taught.

From this background a series of questions related to CALD students' learning in the Australian TAFE sector were posed.

Q.1) How do CALD students perceive their problem-solving skills in an Australian education setting?

Q.2) How do TAFE teachers perceive CALD students' problem-solving skills in an Australian education setting?

Q.3) Does incorporating dialogue strategies enhance the learning of adult students where English is not their first language?

Summary of Background

Students of CALD background are entering TAFE programs in increasing numbers, but there does not appear to have been a systematic examination of how these CALD students problem-solve in a culturally new educational environment. The response to meeting the educational needs of CALD students seems to have been to provide them with instruction in grammar, essay writing, and formal practices related to the presentation of learned material. Little research has been done to bridge the gaps between the CALD student's and the teacher's capacity to interpret the pragmatics of language used in mainstream classrooms.

Summary of the structure of this dissertation

Chapter 1 provided the background to the study and poses the research questions relevant to the study. In Chapter 2, prior research will be examined and the theoretical framework of the study described. Chapter 3 features a brief discussion of the links between Vygotsky's (1978) socio-cultural theory and the three studies which make up the thesis. Chapter 4 will present the methodological framework and results of study 1 and study 2. A brief discussion of the results of these studies will also be made. Chapter 5 will examine the methodology and results of study 3 and in Chapter 6 a discussion of the overall results of the research will be presented.

Chapter 2: Literature Review

This chapter reviews the theoretical positions that have underpinned language based research and its links to cognitive development. The chapter has five interconnecting subsections that are linked to the overall notion that TAFE students who are also CALD students are more at risk in terms of achieving academic success without some form of support or adaptation. This chapter provides first, an overview of adult L2 language learning and Vygotsky's (1978) socio-cultural theory perspective of language development. Second, a review of working memory and metacognition research will be presented, including a consideration of inner-speech theory research in L2 learners. Third, the chapter examines research on long-term memory, metacognition and cultural influences and links this to an examination of cognitive style and problem-solving research. Fourth, the chapter, discusses the problematic nature of CALD students' learning in a different contextual/cultural environment, and finally it brings together the operationalization of Vygotsky's (1978) socio-cultural theory and cognitive theory through Marion Blank's research on levels of dialogue and questioning.

Socio-cultural Perspectives on Language

A key proponent of socio-cultural influences on learning is Vygotsky (1978). Vygotsky proposed that language is a cultural and cognitive tool that is used to pass on cultural and other knowledge from one person to another and from one generation to the next. In this context, language is the cultural intermediary between individuals, especially between the child and his/her parents, or between student and teacher. Thus, language is considered to be a powerful cultural tool through which the mediation and transfer of ideas between individuals take place. Wertsch (2008) operationalized Vygotsky's ideas into four parts that focused on understanding cognitive language in a developmental but hierarchical skills framework. The following section identifies these four levels and although the term child is used Wertsch believed that a similar developmental and hierarchical skills framework process occurs when individuals learn a second language.

Wertsch (2008) has argued that mediated language development and learning takes place within an utterance-based social environment, that is dialogue is the crucial element. At the first level, the child and adult engage in oral interactions involving the child

perceiving the adults' utterances, but not consistently fitting the sounds, the words and their meaning together. At the second level, the child is able to make restricted but reliable cognitive links between object (noun) and action (verb) and the sounds. This is the stage of initial vocabulary acquisition and the formation of basic logical sentences and the start of extended communication. At the third level, the child can make interpretations of adult utterances that allow for fast cognitive connections such that comprehension and a meaningful flow of ideas and communication between individuals are occurring. At the fourth level, the child or person is able to immediately link sounds, language and cognition together in an automatic fashion and so the individual is able to comprehend, problem-solve and reason independently in that language.

The Russian writer Bakhtin (1937/1981) perceived language as a communication tool and argued that there is a continuous interaction between the interpersonal worlds of those engaged in the communication process. This ongoing interaction involves interpreting and refining the joint meaning. This position is not far different from Vygotsky's (1978) position that communication between individuals is socially constructed and possible through the inclusive knowledge of the language used by communicator and receiver. Both Vygotsky and Bakhtin have influenced researchers interested in the socio-cultural impact of language on a person's cognitive thinking processes (Lantolf, 2006; Rozas, 2012). For example, Lantolf argued that the use of verbs across different languages can impact on the receivers' images of an utterance, which can then impact on the memory of the communication. He claimed that English verbs were more supportive of visual imagery and so were more effective in assisting the memory process. For example, the English description "Tarzan swings through the jungle" provides a rich opportunity to visualise the actions of Tarzan. Lantolf goes on to claim that "English speakers are much more likely ... to develop a 'rich' mental imagery of motion and the 'manner of motion' and the manner of motion will be salient in memory of events and in verbal accounts of events" (Lantolf, 2006, p. 78). As a consequence of the differences in verb usage, Lantolf suggested other languages, such as Spanish, used more gestures as a communicative device that added meaning to the communication. Thus, from a socially-constructed perspective, understanding, communicating, and even thinking in a second language requires more than just knowing the words; it requires an ability to comprehend the wider cultural aspects and pragmatics of language (Bakhtin, 1937/1981; Lantolf, 2006; Vygotsky, 1978; Wertsch, 2008).

Language and Cognitive Development

Bräten (1991) has pointed out that the importance of Vygotsky's (1978) work was in terms of a theory that links human cognitive development with language development and the mediated way in which language is internalised by the individual in the relationship with significant others. Vygotsky emphasized a relationship between the individual, a culture, and language, where language is the communication tool between a transmitter and receiver of the utterances (Hatano & Wertsch, 2001). For Vygotsky, a language system was more than understanding the words and word meanings, or syntax, of a given language. Rather it is perceived as the verbalisation of an inner thinking process of an individual. Although it is important to have knowledge of words and word meanings, language also comprises comprehension and thinking (Blank, Rose & Berlin, 1978; Luria, 1999; Wertsch, 2008). This issue is of relevance in understanding second language learners who have to learn to operate and think in a different language and cultural context to that of their first language and their home culture (Gredler, 2009; Smagorinsky, 2009).

Wertsch (2008) interpreted socio-cultural theory by expanding on Vygotsky's (1978) idea of the Zone of Proximal Development (ZPD) to argue that mediation occurs between the communicator and receiver and what Eun, Knolek and Heining-Boyntonet (2008) have described as a third "inner voice". The third voice has its origins in Bakhtin's (1937/1981) idea of a perpetual interaction of hidden dialogue within a person with the person's environment. The third voice notion suggests that there is a broader context in which a spoken exchange takes place than just that between communicator and receiver. When considered from this perspective a teacher in front of a class communicates using his/her spoken language, but also thinks about what is occurring and what he/she is saying and thinking in the third voice (Eun et al., 2008). The role of the third voice is the planning of the dialogue and is related to metacognition (Bräten, 1991; Rozas, 2004). Similar findings have been reported for students, and these are discussed later in this chapter.

Wertsch (2008) connected an individual's capacity to interpret spoken language to cognitive development that is socio-cultural in context. Within the socio-cultural context, cultural artefacts and interaction with others is considered a major contributing factor to the development of mind. However, the "participation is not assumed to induce uniform cognitive effects" (Hatano & Wertsch, 2001, p. 80). In other words, although the socio-cultural context is important at the micro-environment level, individual development and

factors related to the individual development need to be considered. Shared cultural tools such as language provide a commonality between members (Hatano & Wertsch, 2001), but each individual also has a unique place in that socio-cultural context. Traditional culture has been seen as a hidden variable that is not readily able to be studied; however, in recent times a number of writers have questioned that position (Di Maggio, 1997; Hong & Chiu, 2001; Wertsch, 2008). It is argued that the relationship between individual development and culture is more dynamic than stagnant. Culture provides templates that may, or may not, be integrated by the individual. Hong and Chui (2001) have referred to this more general relationship between individual and culture as “domain specific implicit theories” (p.188). For example, in many Asian cultures respect for the elderly is an embedded value, and this leads to children having respect for adults more generally. As a consequence, Asian students are generally more respectful of their teachers than are students in Australian classrooms, where society is less formal. These socio-cultural values are likely to have an impact on CALD students from other cultures in Australian classrooms.

Hatano and Wertsch (2001) have reported that, although socio-cultural theory is not interpreted in the same way by all researchers, there are three principles that are consistent across all interpretations of the theory. The first principal is that cultural tools or cultural mediation processes are integral to cognitive development. Second, cognition is linked to socio-cultural discourse and cultural models. Third, socio-cultural specialisations influence cognitive functioning. The first principle acknowledges the need to understand the impact of language and cultural narrative on shaping a person’s thinking, and the second principle acknowledges how oral information impacts on the development of cognitive and cultural schemata on how the social setting operates. The third principle recognises the way that knowledge that is institutionally driven (such as domain specific jargon) impacts on knowledge formation. That is, understanding the specific terms can help summarise the concept being taught, for example, understanding the word ‘kinship’.

Language development

Western ideas about language development have been strongly influenced by the work of theorists such as Chomsky (1965, 1986, 1995) and Pinker (2001). Chomsky has argued that, to a large degree, innate endowments contribute to a human’s potential to be able to acquire language. Universal Grammar (UG) is considered a key feature of Chomsky’s theory (Chomsky, 1965) and is identified as a set of genetically-driven

grammar principles that guides the development of language in all humans. In more recent times the principles of UG have been reconceptualised by Chomsky into what he has called the Minimalist Program (MP) (Bley-Vroman, 2009; Chomsky 1995) which suggests that language acquisition is essential for communication but is confined more to the development of a vocabulary and a word lexicon that then allows different languages and cross variations of vocabulary to develop (Bley-Vroman, 2009; Christiansen & Chater, 2008; Chomsky 1995; Putman, 1994)

In contrast to Chomsky (1965, 1986, 1995), Pinker (2001) has conceptualised a theory of human language development that has taken place in humans by the gradual cognitive acquisition of language faculties. The process of natural selection of individuals with more of an ability to acquire and use language for effective communication, social organisation and planning took place. That is, the ancestors of contemporary humans developed the skill to communicate and so these ancestors had an advantage in their physical environment in terms of finding food and shelter and hence survived. Pinker is a strong supporter of the role of human cognition development from an evolutionary and natural selection perspective, whereas the followers of Chomsky's ideas have maintained that natural selection played a small role in language development in humans (Bley-Vroman, 2009; Christiansen & Chater, 2008). Although these are different theories of language development, each of these theories holds to the notion of cognitive processing as the core in terms of acquiring and using language (Christiansen & Chater, 2008). Language acquisition is easier to acquire when a child is young and once a first language is established the structure of that language becomes the foundation for the on-going expression of ideas and thoughts.

Chomsky's (1965) thinking on human language development is not without criticism. Weist (1967) for example, has argued, from a behaviourist perspective, that human language utterances and so acquisition can be observed, measured and so improved. The concern of Weist, and more recently of Putnam (1994) is that conceptualising language development from a more innate human biological endowment perspective fails to recognise the importance and role of instruction in the language acquisition process. This is, in part, an extension of the traditional debate in psychology about the role of nature (innate human biological endowment) and the role of nurture (the influence of the environment) on human development (Christiansen & Chater, 2008; Lester, 2011; Scott,

2010). For Christiansen and Chater, and Lester this nature/nurture debate is still relevant with researchers focusing on language-specific brain development that is driven by biological endowments but also influenced by instruction and nurturing.

Second language learners and the fundamental difference hypothesis

Chomsky's ideas of language acquisition (Chomsky, 1965, 1986, 1995) suggest that humans are cognitively programmed to acquire language at an early age, but this processing occurs naturally and is an inbuilt and universal process for all babies, and young children. According to Chomsky, this natural, inbuilt, cognitive language acquisition stops for humans at a given period of the child's development, and therefore from that point onwards language acquisition has to be acquired through instruction and deliberate effort and learning. From a Chomsky perspective, the first language that was acquired when the child was young is the foundation language and the one the person uses to think with, to operate with and to communicate with within a social network. The second language learner (L2) therefore uses his/her first language (L1) knowledge to decode and comprehend the second language (L2) (Herschensohn, 2009; Montrul, 2009; Song & Schwartz, 2009).

Bley-Vroman (2009) has used Chomsky's ideas of language acquisition to explore some of the problems that second language learners face in operating in a second language environment. The first language and the second language are markedly dissimilar, with Bley-Vroman, (2009) stressing this point by arguing that the two languages are so fundamentally different (for example English and Chinese) that he uses the term Fundamental Different Hypothesis (FDH) to explain the problems individuals have when acquiring an additional language. Until the second language learner stops needing to use his/her first language (L1) knowledge to decode and comprehend the second language (L2), the learner is going to be slower in processing the second language, because the L2 person's thinking processes are located in the first language (Montrul, 2009; Song & Schwartz, 2009). Thus, in a second-language learning and communication environment, there are more memory and memory capacity demands placed on the individual. In addition the person's first language interferes with the individual's ability to think and operate easily within the second language context (Bley-Vroman, 2009; Song & Schwartz, 2009).

Bley-Vroman (2009) argued that the interference of the first language reduced the person's ability to operate reliably in the second language context and that for a dependable level of proficiency to occur there must be a convergence between the two languages in the person's cognitive processing. In addition, the second language is considered reliable and convergent when the individual can succeed in thinking and learning in that language, and can achieve outcomes similar to his/her peers who are operating in a first language context. The concern is that for many L2 individuals their second language is not reliable and they have not achieved cognitive convergence. Christainsen and Chater (2008) have illustrated this concern using pronouns such as 'him', 'them', 'himself' and 'themselves', which are often handled differently in the person's first language and so this knowledge interferes when English is the second language, such that the L2 might say "John sees him" (incorrect English grammar use), rather than the correct English grammar "John sees himself".

Comprehension and L2 learners

In addition to a knowledge of everyday language usage, students in school and professionals in society also need to understand the language of the different curriculum areas, such as mathematics, science, English, or the specialised language associated with a profession, such as that used by a lawyer, a social worker, or an accountant. Comprehending and using both the everyday language and the specific language associated with a particular profession or body of knowledge can be a challenge for L2 learners (Brent, Gough, & Robinson, 2001). One of these challenges is the ability of the individual to comprehend, reason, and use abstract thinking quickly when the individual is operating in an L2 social context (Brent et al., 2001). The claim is that L2 adult learners are less able to use abstract processing structures to solve language-based problems in an L2 learning context (Belikova & White, 2009; Galasso, 2002). There are two possible reasons for this. The first is the L2 learner lacks proficiency in understanding how ideas link together in the second language and this lack of facility is often related to a limited comprehension of specific words and concepts. The second reason is associated with reduced speed of cognitive processing because the L2 learners are still internally translating the words from L1 to the L2 and this reduces their ability to form a conceptual understanding of the topic (Bialystok, McBride-Chang, & Luk, 2005; Proctor, August, Carlo, & Snow, 2006; Ullman 2001). These researchers are not saying that second

language learners are less intelligent, but that the L2 learners have difficulties in forming the fast cognitive links between two or more concepts.

This issue of comprehension and inferential thinking has been explored by researchers investigating reading comprehension and students who are second language learners (Holger, 2013; Lervag, & Aukrust, 2010; Uchikoski, 2013; Verhoeven, 2000). The argument is that because L2 learners, on average, have a poorer command of the language they are learning, their linguistic comprehension will be less effective and they will, therefore, be at risk of reading difficulties and classroom instructional comprehension difficulties. If too many words are unknown to the reader of the text (Carver, 1994; Proctor et al., 2006), or too many words are unknown to the listener in the conversation (Paul, 2007), it is likely that the comprehension of the content will break down altogether, whether that content is delivered in a written text form or in an oral verbal form. Certainly, adequate reading comprehension, listening comprehension, and instructional comprehension skills are crucial for virtually all aspects of formal education as well as for full participation in society of individuals who are L2 learners (Bialystok et al., 2005; Lervag & Aukrust, 2010). An example of this concern is an L2 student who reads a passage from a written English story and can answer questions that relate to the characters and *what* they did and *when* they did something, based on the information provided in the text; however, the same L2 reader is less confident about answering questions about *why* the characters did something or what will happen next (Holger, 2013; Verhoeven, 2000). These inferential and abstract comprehension questions require the L2 reader to have a greater level of background understanding of the text, a reliable vocabulary knowledge associated with the text, and an ability to relate different parts of the text together (Bialystok et al., 2005; Holger, 2013; Verhoeven, 2000). In terms of students who are L2 learners, Lervag and Aukrust (2010) have argued that second (L2) language learners have more limitations in terms of their vocabulary skills and so have poorer reading and instructional comprehension skills, compared with first (L1) language learners. Hence significantly more pedagogical attention needs to be given to L2 learners in the classroom. This concern is not restricted to secondary school students, but is also an issue for students who are adult L2 learners (Montrul, 2009).

With reference to pedagogical practices, there is a repeated call for teachers of L2 students to teach more vocabulary and the different semantic usage of those words (Holger,

2013; Proctor et al., 2006; Ullman, 2001; Verhoeven, 2000). Associated with this expectation is a need for teachers to explain to L2 students the meta-linguistic structure of sentences they read and hear, and for those students to have opportunities to discuss the meanings of words, phrases, and concepts and to practice using them (Jackson & Bobb, 2009; Montrul, 2009). Developing this vocabulary and meta-linguistic knowledge enhances L2 learners' ability to problem-solve in the second language and so enhances their ability to learn reliably and be successful in the L2 context (Bley-Vroman 2009; Montrul, 2009). These pedagogical practices are also considered to enhance the L2 learners' ability to process language-based information more effectively into their long-term memories, which enhances their ability to consistently recall and retrieve this information from long-term memory when required (Mayberry, 2006; Ullman, 2001). The use of language and how the words are put together to form concepts and understandings is important in reference to explicit instruction by the teacher to L2 students about words, and their meanings (Mayberry, 2006; Thorne, 2005). This process is not just for when the L2 students first enter into a second language context (such as when adult L2 students first arrive in Australia to study at university or TAFE) but needs to be a deliberate and ongoing practice of language and pedagogical support (Smith, 2010; Tran, 2011). The reason why this instruction often needs to be more explicit is because of the differences between a student's first language and how this student forms meaning in that language, and the student's new need to operate and think in a different language with different sounds, patterns and rules (Herschensohn, 2009; Thorne, 2005). From this viewpoint, language also needs to be considered from both a cognitive and a socio-cultural perspective.

Mediated learning: Language and cognitive development

Socio-cultural theory, as informed by the work of Vygotsky has linked language to culture and cognition (Bräten, 1991; Hatano & Wertsch, 2001; Luria, 1999). Bräten, however, argued that effective self-regulation of speaking and comprehension does not fully occur until inner-speech and thinking operate as one system. Mediated activity allows metacognitive processing to develop and is influenced by cultural tools such as language (Bräten, 1991). This notion also relates to the "inner voice" (Eun et al., 2008). Hatano and Wertsch (2001) have also noted that participation in cultural activities is not compulsory, but repeated practice in using the words and concepts enhances the cognitive skills of the learner. The significance of the mediation process is in explaining the bridge between

other regulation and self-regulated activity. The participation in learning activities contributes to the individual's development of knowledge that is contextually located. These ideas are particularly relevant to CALD students who are both living and learning in an unfamiliar context.

Language as a cognitive tool

Culatta, Blank and Black (2010) have argued that structured instructional dialogue between teachers and students can increase students' comprehension and so build their cognitive strategies. For example, in class "academic" questions may ask students to reflect and share what is already known about a topic area in context (What has happened in this picture?) In contrast, "application" questions create opportunities to develop pragmatic thinking (How did this happen?). Higher order questions may address cause and effect (Why did this happen?). Questions that develop the discourse between teachers and students are not always simple and can be used by teachers to scaffold students' thinking (Lattuca, 2002).

In a study of middle school students' inner (self-directed) speech development, Lidstone, Meins and Fernyhough (2010) exposed a group of students to a dual task paradigm, where they were required to undertake two tasks simultaneously. The dual task paradigm involved having participants use a distraction procedure while attempting to solve a problem. The study results showed that, during middle childhood, students' planning was dependant on self-directed speech. This study links the development of inner-speech to problem-solving as framed by Vygotskian theory, and supports the ongoing development of inner-speech. The study also made a distinction between the role of private-speech and the development of inner-speech. Private-speech was considered to be found in pre-school age children and gradually became inner-speech as the child developed. Lidstone et al. also pointed to private-speech being present in adolescents and adults, but it often took the form of reflection and sometimes muttering and whispering to oneself. The Lidstone et al. findings are consistent with Vygotsky's (1978) idea that inner-speech and verbal mediation of cognitive planning becomes more evident around middle childhood. In terms of cognition, this inner-speech also plays an active role in rehearsing information and so it is considered to be a significant agent in the development of memory (Atabati, Jahangiri, & Mokhber, 2011; Williams, Bowler & Jarrold, 2012). The suggestion

is that this repetition of information facilitates its placement and encoding into a person's long-term memory.

Gredler (2009) has identified four learning stages related to the linking of language with thinking. The first two stages are related to the external support from others for the development of an individual's thinking, while the final two stages are those in which an individual's control of memory, attention, and conceptual thinking are put in place, and these are metacognitive. This development occurs within the framework of the linguistic and the cultural and contextual setting of the person. The outcome of this development is that language not only reflects the culture of the person, but also impacts on memory, attention and conceptual thinking of the person.

In terms of Vygotsky (1978) theory and memory, only those concepts and words that are known are encoded into long-term memory. These words are retrieved from long-term memory when there is a contextual stimulus; for example, the words and concepts about 'sustainability' are encoded using discussion and reflection. This construct is retrieved when they are stimulated, for example, by the teacher asking the student what does the word 'sustainable' mean to us. From a Vygotsky social learning context and the memory research by Baddeley (2004), the more elaborate the encoding the better the retrieval from long-term memory.

Working memory and metacognition

It has been noted by several writers (Baddeley, 2004; Kulkofsky, Wang, & Hou, 2010; Pae & Sevcik, 2011; Swanson, Gerber, & Saez, 2006; Woltz, 1988) that at the core of the student learning is memory processing and that processing is enhanced if it is organised. On this point, Koriat, Bjork, Sheffer and Bar (2004) and Shah and Oppenheimer (2008) have suggested that the use of heuristics offer one means by which information can be cued for recall from long-term memory and also organised into long-term memory. Heuristics from a memory perspective involve a repeated set of steps or strategies that make a "string" that are completed in a set order (Duke, Pearson, Strachan, & Billman, 2011; Mastropieri & Scruggs, 2000). For example, the reading text comprehension strategy PQ4R can be classified as a heuristic, as by recalling the name PQ4R the student is able to follow the steps and strategies that collectively help in the comprehension of the read text material. The PQ4R heuristic stands for: Preview the text to be read; ask yourself

some Questions about what to look for in the text; then Read the text; Reflect on the text; Recite back to yourself what you think the text is saying and; Review and look over the text. Another example of a memory heuristic when learning to spell a word is the Look, Say, Cover, Write, Check strategy. In this strategy the student: Looks at the word and its letters; Says the word aloud looking at the word; Covers the word to spell the word aloud without looking; Writes the word and checks to see if the word is spelt correctly. Related to the memory strategy of heuristics is the use of mnemonics (Mastropieri & Scruggs, 2000). Mnemonics are auditory or visual memory cues that assist in recalling information from long-term memory, for example, when trying to remember the names of the eight planets from the sun (Mercury; Venus; Earth; Mars; Jupiter; Saturn; and Neptune) the student may recall the mnemonic for this as: My Very Educated Mother Just Served Us Nuts. Many of these heuristics are language-based so that students who come from a different language background are likely to be disadvantaged if presented with these strategies.

The fluent encoding of information into people's working memory and retrieval of that information from their long-term memory influences and enhances their learning. Woltz (1988) perceived people's working memory (WM) as a system that involves both declarative knowledge (knowledge about facts, for example, what is the national capital of Australia) and procedural knowledge (knowledge about processes, for example, how do you work out the area of a circle). On this point, Cowan (2004) argued that both declarative and procedural knowledge had to be cognitively organised and processed if it was to be used effectively in learning, and this organisation was influenced by the students' working memory capacity. One of the limitations in the encoding of information into memory is working memory capacity and processing, and unless the information is systematically understood when heard or read, then processing into long-term memory is interfered with and the information is not comprehended and so stored and learnt. One way to conceptualise working memory is to ask people to say back a set of numbers. Most adults can say back four numbers (for example 8, 2, 6, 3) and if focussed an additional two or three numbers (8, 2, 6, 3, 7, 5, 9) can be said back, but past seven numbers, recalling orally presented and unorganised and un-rehearsed numbers becomes more difficult to remember (Cowan, 2004). Asking to repeat and recall back 10 numbers burdens working memory and so processing of information becomes impaired, because the working capacity of memory has been congested and overloaded. This research on working

memory capacity has been replicated with repeating back words, with similar outcomes to those reported with numbers (Hulme, Thomson, Muir, & Lawrence, 1984). If, however, the words are known or the words have meaning, or can be organised together into some cluster, then the recall of those words is higher, whereas with unrelated or unknown words it is harder to process and so recall and repeat back. This research by Hulme et al. is consistent with the thinking of Woltz (1988), who argued that working memory load improved as learners' improved in their understandings of words and how to use those words to form concepts and understanding. For example, once students have developed an understanding of the word "sustainable" they could then use it as an adjective to comprehend the words "sustainable development" and "sustainable farming". Over time, in working memory the word "sustainable" becomes a concept that can link to a range of related ideas, which can be added to and also retrieved from the long-term memory when required (Baddeley, 2004; Cowan, 2004; Hulme et al., 1984). In relation to a second language (L2) adult learner in a mainstream TAFE classroom, this might involve first listening to the words and concepts a teacher uses and, as the students develop a greater understanding of these words, the adult student is able to comprehend subtle pragmatic communication differences and similarities associated with the words and concepts, and so use these concepts in their spoken and written communication.

With specific reference to children's potential to be effective readers in a second language, Swanson et al. (2006) examined the contribution of short-term memory (STM) and working memory (WM) when the students were reading in a second language. This research identified that there was interference from the first language on the ability of the child to quickly operate in the second language. This interference was strongest at the early stages of matching letters to sounds, which is associated with phonological memory within short-term memory. That is, the student develops the ability to retain the matched letters and sounds long enough in short-term memory, through rehearsal, to allow the information to be transferred into the student's long-term memory for the processing of the information to occur. A phonological loop operates, defined by Swanson et al. as a verbal STM that is made up of two components, a phonological input system and a rehearsal system. They go on to state that a child's word learning ability is best predicted by phonological memory and that this structure contributes significantly to a child's ability to learn a second language. Specifically, Swanson et al. supported the idea that language specific short-term

memory plays an important role in individuals learning a second language and also in reading in a second language.

The findings from the above study showed that children at risk when reading in a second language had more language-specific short-term memory and general working memory problems. The results also showed that high scores on word recognition reading tasks did not necessarily show high scores on comprehension tasks. That is, it was not a lack of understanding of the individual words that caused the loss of comprehension of the presented information but when the words were grouped in unusual ways, or used in an unfamiliar context, or too many new words were presented in the one context, or words were given too quickly that had an impact on comprehension. This finding is relevant to this study because it is not at the individual written or spoken word level that difficulties in understanding are occurring with students, but in the presentation of that information which does not allow for the cognitive processing of the individual words (Geake, 2009).

For Swanson et al. (2006), teachers who are working with second language learners need to take the time to explain the words and their meaning and to provide models about how those words are said in the second language. The teacher also needs to give the student time for chunks of information to be reviewed and processed before moving on to the next chunk of information. It also requires the teacher to clarify what is being said or written and for the student to match this with his/her thinking and understanding. In short, the teacher has to put in an explicit pedagogical component into the activity, and be less focussed on the delivery of content but rather on how the student is cognitively organising the presented information delivered in the second language. The argument is that true comprehension of the words will occur when the second language learner can say and understand the words, know their usage, and cope with the speed in which these words are presented. Thus, according to Swanson et al. (2006) language specific short-term memory processing factors contribute to difficulties in comprehension of reading and listening to information in the second language and teachers have to be aware of this and adapt their teaching accordingly.

In a related study to that conducted by Swanson et al. (2006), Pae and Sevcik (2011) conducted a study of reading development with students who were second language learners. Pae and Sevcik also noted: (1) that second language learners' verbal working memory showed slower cognitive processing speed with unfamiliar words; and (2) that the

students' imprecise decoding of words and their ability to understand those words contributed to their slower memory and cognitive processing. That is, the students were having difficulties in comprehending what they read, and in making higher order cognitive and memory processing decisions on the read material, because they were more limited in their ability to link the words together quickly. Pae and Sevcik claimed that if the second language learners did not understand one part of the set of words, the comprehension of the whole set of words became reduced, and they suggested a more explicit teaching of words and memory strategies to second language learners. These authors noted that second language learners were not cognitively inferior, but that the extra cognitive load involved in learning a second language or operating in a second language context slowed their memory processing of the information.

Borst, Taatgen and van Rijn (2010) proposed that cognitive bottle necks occurred when tasks were not easily organised or were too complex. They gave the example of a task in which a person is writing and speaking to a colleague at the same time, both tasks relying on language faculties and, being complex tasks, each task requires significant cognitive processing. It is likely that a second language learner is faced with a similar processing bottleneck as the memory processing system has to cope with translating information quickly and then organising that information into long-term memory. The evidence is that, while the memory processes of all people are similar, requiring encoding into memory and retrieval from memory, there is uncertainty about how such processing operates with L2 learners whose inner-speech and encoding may not match the content quickly enough to allow for quick processing of the task.

Inner-speech in an L2 learner

Vygotsky's (1978) theory suggests that all individuals engage in inner-speech. With specific reference to inner-speech and second language learners, De Guerrero (2005) examined how first language inner-speech (L1) mediates an adult L2 learner's comprehension of the L2. That is, L2 learners often still process their thinking in the first language (L1) and they use this inner-speech as a metacognitive tool. For De Guerrero, this inner-speech is a form of internal thinking that L2 learners use to comprehend the information, and this is a process that helps L2 learners make decisions about what they are reading or listening to. The claim is inner- dialogue facilitates students remaining motivated and process orientated, in particular when the L2 student is working with

confusing or new information (Zakin, 2007). Zakin has summarised this relationship between student's inner-speech and his/her metacognition as one in which metacognitive thinking can be facilitated by the person's use of inner-speech and this inner-speech is an internal mediator of the person's deep personal thinking processes.

As a part of the process of learning a second language (L2), De Guerrero (2005) has suggested that the person goes through a period of private-speech development similar to a child's learning of a first language. The person's first language is thought to mediate the learning of the second language as the thinking is initially in the first language. De Guerrero provided evidence of this private-speech development when reporting the result of a study in which students learning the second language reported playing back to themselves words that they had developed meta-linguistic difficulties with in school. This process is considered to reflect the way in which individuals initially have to use an explicit and conscious metacognitive process when thinking in the second language, but over time this thinking process becomes more fluid and more unconsciously metacognitive (Efklides, 2008; Hatano & Wertsch, 2001; Zakin, 2007). An example of this transition from a conscious metacognitive process to a more unconscious metacognitive process is provided by De Guerrero and Villamil (2000), who examined the mediation process used by two adult second language students who were engaged in writing tasks. The outcome of the study provided evidence that the students initially used their first language to support the development of their thinking and understanding of writing in English as the second language, but over time they were able to transfer their thinking, planning, and metacognitive decision making into English as they developed their competency in that language.

Adults and older children learning a second language have to develop a second inner-speech, but this second one needs to be more in the second language (De Guerrero & Villamil, 2000; Efklides, 2008). The suggestion is that once the L2 learner can fluently think and process in the second language then their higher order thinking and abstract reasoning is enhanced (Hatano & Wertsch, 2001; Hedegaard, 2009; Magimairaj & Montgomery, 2012; Zakin, 2007).

This transition from thinking in a home language about second language topics is not a quick process (Hatano & Wertsch, 2001). The inner-speech translation from home language to second language places a heavy burden on working memory as the

“transcribing” of the vocabulary and syntax from one language to the second language takes place. This heavy cognitive and memory load takes a toll on the potential of the second language learner to attend to a range of activities that might otherwise be possible without the cognitive burden on language decoding and processing (Hedegaard, 2009; Kulkofsky et al., 2010; Magimairaj & Montgomery, 2012; Pae & Sevcik, 2011). This cognitive processing burden is more evident when inner-speech has to deal with unfamiliar terms and abstract vocabulary, or if a word has a specific reference to the jargon, or terminology of an academic discipline (Borst et al., 2010; Hatano & Wertsch, 2001). As noted earlier, Borst et al. (2010) have argued a case for what they have called cognitive bottlenecking, which is linked to working memory and the limited capacity of working memory to process rapidly new and unfamiliar information. The evidence suggests that in culturally different classroom settings the CALD student has to use conscious cognitive processes to interpret the language of instruction. Given that there are also likely to be general working memory capacity issues for CALD students, as they have to rapidly comprehend new terms and expression, the indications are that CALD students are more at risk in their second language environment in terms of their learning.

Evidence of cross cultural differences in social mediation and cognitive processing

Cross cultural developmental studies have shown that there are differences in parental expectations about children’s upbringing. These studies have contributed to the understanding of contextual differences in child rearing practices across cultures, while also showing that developmental trajectories related to social interaction and metacognitive processing cannot be considered a wholly biologically driven process, or uniformly the same across cultures.

Kartner and Chaudhary (2010) conducted a cross-cultural study of child development, by comparing German and Indian middle-class families. The emphasis of the study was on examining how pro-social behaviour developed across individualist and collectivist societies, with German society being the more individualist and Indian society being the more collectivist. Findings from the study suggest that there are social and developmental patterns that are culturally influenced. The Berlin (Germany) mothers showed more support for autonomous socialization goals for their toddlers, which was

considered to be an individualist goal orientation and were less supportive of socialisation goals than the Delhi (India) mothers.

In a study of cross cultural differences of metacognitive development, Sanagavarapu (2008) focused on an examination of differences in metacognitive guidance between children and mothers in an Australian setting, and compared cultural patterns of metacognitive guidance provided by Indian and Anglo-Australian participants. The results of the study suggested that when developing metacognitive processing skills in their children Anglo-Australian mothers' used a cultural framework focused on independence, while the Indian mothers used a cultural framework that focused on interdependence. Sanagavarapu also argued that there were linguistic differences in the mediation used by mothers from the two cultural backgrounds. The Anglo-Australian mothers used explanations to mediate their children's problem-solving, whereas the Indian mothers tended to use directives to reach the same objectives.

In a cross-cultural study between Saudi Arabia and England, Al-Namlah, Fernyhough and Meins (2006) investigated the development of private-speech as a precursor to inner reflective speech in both individualist and collectivist cultures. Self-regulatory private-speech development was shown in both Saudi and English children and they suggested children who use self-regulatory private-speech while problem-solving were able to problem-solve more quickly than those who didn't use private-speech. Private- speech was developed in the child's first language.

Implications for cross-cultural education

These studies have implications for any education system in which culturally diverse students are engaged in learning. They show that individuals of differing cultural backgrounds are likely to approach metacognitive processing differently and this has implications for teaching those individuals. Also, adults of different cultural backgrounds are likely to carry at times different implicit metacognitive models about how and when to problem-solving in their new cultural and educational settings. Thus they could find difficulties in applying "traditional" models of problem-solving to new learning tasks, while also having to deal with difficulties associated with comprehending their teachers' instructions which may be delivered at a rate, or in an accent, that they are not familiar with, as well as quickly decoding unfamiliar words, phrases and concepts in the culturally different educational setting.

Tadmor and Tetlock (2006) indicated that there has been little research into the ways in which exposure to a second culture could influence cognition, particularly in adults. Tadmor and Tetlock have also noted that cultural differences and individual responses to the new culture can be influenced by the congruence, or incongruence, between these factors. Where it might often be suggested that language experience is by itself a key to embracing a host culture, it is likely that being able to navigate cognitively a new culture is vital to an individual's mental health. At the individual level, Simsek (2010) has reported that a child's ability to label concrete (real) objects allows for the initial development of a child's ability to communicate and interact with others, a finding that could impact on students who are studying and living in a different culture.

These studies suggest that young adult CALD students coming into a different contextual culture of learning, such as Australia, may have additional difficulties that go beyond learning the functional language of the new country. If the person of CALD background needs to process inner-speech via their first language (L1) from the second language (L2), then there are likely to be difficulties with working memory load related to decoding contextual information. They may use their implicit cultural knowledge to problem-solve in the new cultural context with mixed outcomes.

Wang and Thorns (2010) provide an example of the experience of adult migrants applying implicit knowledge in a new cultural setting. They examined migration to New Zealand of skilled workers and the degree to which the migration of skilled Chinese workers had been successful or not. Wang and Thorns reported that there is evidence of poor performance among newly arrived skilled migrant in gaining employment in New Zealand. However, they have also reported that skilled migrants who had been in the country for ten years experienced similar unemployment rates to locally trained university graduates. Wang and Thorns drew the conclusion that this evidence suggests that skilled migrants needed time to adapt to the New Zealand labour market. Accordingly, Wang and Thorns proposed that the difference between the newly arrived skilled migrant worker and the skilled migrant worker who has been in the country for a period of time is not their explicit knowledge of the area in which they work, but rather the implicit knowledge of the working environment (Wang & Thorns, 2010). The claim is this awareness develops over time from cultural knowledge about the differences between New Zealand and Chinese workplaces, and this knowledge difference is contextual. This study highlights the

pragmatic difficulties faced by skilled people of CALD background attempting to develop an understanding of the host culture's work practices.

It was proposed by Ellis (2006) that explicit knowledge (being consciously aware) and implicit knowledge (being unconsciously aware), contributes to the learning and processing of a second language. Ellis has argued that for CALD students they need to master the explicit knowledge such as the grammar structure and the vocabulary before they can gain a greater level of implicit knowledge (a more abstract understanding) of the language. For example the implicit understanding of the phrase "it is raining cats and dogs" is it is raining heavy. In a learning context a teacher who says "take your time and read the instruction" is not saying the exam is untimed, but rather the teacher is saying, be careful and read the question before writing your answer. The indications are students who have difficulty with implicit understandings of phrases are likely to feel more uncertain about thinking about problem-solving and could develop anxieties about their study potential in a new cultural context. Issues about anxiety in CALD students are explored in the next section.

Cognitive style and anxiety

The use of the term cognitive style has lacked a clear definition of what it actually refers to, according to Riding and Cheema (1991). They suggested that cognitive styles need to be more clearly distinguished from learning strategies, which they saw as more specific to a particular context, such as learning strategies to enhance reading. Riding and Cheema claimed that cultural or contextual factors have limited influence on the development of a person's cognitive style, which are more universal. This notion is in contrast to Wertsch (2008) who claimed that socio-cultural factors do contribute to an individual's use of learning strategies and problem-solving strategies. Peterson and Meissel (2013) have pointed out in relation to cognitive style research that there has been an emphasis on biological factors related to cognitive style, however, using a Vygotskian focused sociocultural approach to examine cultural differences "...in perceptual processing suggests that this line of research may prove fruitful" (Peterson & Meissel, 2013, p. 222).

Kozhevnikov (2007) defined cognitive styles as being "individual modes of perceiving, remembering, thinking, and problem-solving" (p. 464). Kozhevnikov maintained that there is evidence that cognitive styles are stable over time and related to a person's personality and intelligence. Kozhevnikov also points out that there is evidence

that individuals' social, educational, professional, and environmental requirements influence their cognitive reasoning and thinking. In this context, it is suggested that although individual factors contribute to cognitive styles, there are also socio-environmental factors that contribute to such styles and that cognitive styles can be grouped according to the level of information processing required. For Kozhevnikov (2007), socio-cultural factors contribute to the uniqueness of people's usage of self-regulation of emotions and thinking, their use of higher-order reasoning, and their use of metacognitive and cognitive processing strategies.

This notion that culture, experience, and past learning all influence people's reasoning has also been explored by Hornik and Tupchiy (2006). For Hornik and Tupchiy, cultural differences can be framed at the individualist (person level) as well as the collectivist (group or large cohort) level. A number of researchers (Cuker, De Guzman & Carlo, 2004; Oyserman & Lee, 2008) have expressed the idea that the collectivist and individualist notions are fluid and depend on the context. For example, a student from an overseas country in his/her own home culture could be collectivist in that context. That is, in his/her home school setting the individual understands the cultural norms about how to behave in class, how to respond to the teachers and how to present as a member of the class group. There is thus an alignment of the person's own individual beliefs and actions and the group's collective beliefs and actions. To this extent Hornik and Tupchiy adopted a view of collectivism and individualism that also accounted for individual differences in these concepts, and defined several dimensions. The added dimensions include a "Horizontal Collectivist" dimension, for those individuals who wish to be part of the group, but not subordinate to the group. "Vertical Collectivists" are individuals who are group focused and submissive to the group's needs. "Horizontal Individualist" is an individual who want to be distinct and unique from the group, while the "Vertical Individualist" is an individual who seeks status and authority (Trandis & Gelford, 1998).

The problem is that by the individual shifting to another social, cultural, or learning context, there may now not be a good alignment between that individual's own beliefs and expectations and the new group's collective beliefs and expectations of him and her (Saville-Troike, 2012). Or the individual in a new context has to become more of a collectivist and group focused where they would prefer to be more independent of the group and be an individual (Trandis & Gelford, 1998). The consequence is that in the new

context the CALD student is more likely to be an “outsider” and so is now less sure how to behave in class, how to respond to the teachers, and how to present as a member of the class group. Thus the student is unsure of the collective new rules and so is more likely to be passive in that context (Saville-Troike, 2012). Until there is an alignment between the CALD student’s own beliefs and actions and the new group’s collective beliefs and actions, the student is likely to be confused and in this new context the student from a different cultural background is not yet a collectivist in the new context or able to operate as an individualist. This poor alignment of the CALD student’s old educational values and ways of operating in class with the new educational values and ways of operating in class causes the student to become stressed and anxious (Long & Porter, 1985; Saville-Troike, 2012).

The claim is that this anxiety interferes with learning for the L2 student in this new context and even in some cases inhibits the cognitive learning or production of a second language (Horwitz, 2010). This anxiety in the new learning language context has been noted for some time, with Scovel (1978) suggesting that this is more of an issue at the start of new learning experience or when demands are made on the student in terms of sitting exams or answering questions. Typically, this form of anxiety has been referred to as language anxiety or foreign language anxiety (FLA) and this anxiety is categorized as a situation-specific anxiety, similar in type to other familiar manifestations of anxiety, such as stage fright or test anxiety (Gkonou, 2011; Horwitz, 2010; Horwitz, Horwitz, & Cope, 1986).

The suggestion of Gkonou (2011) that classroom anxiety is higher for L2 students compared to non-L2 learners in the same classrooms is a significant issue, and may help to explain concerns about why it is that this cohort of students is more at risk for not achieving to their cognitive potential in their new learning context (Saville-Troike, 2012). The suggestion that foreign language anxiety interferes with the learning and thinking of L2 students is not that unexpected for, as Scovel (1978) noted some time ago, high levels of anxiety have a negative impact on all students’ learning and thinking. It is, however, more recognised with foreign language students because it is new to them and they are more likely to demonstrate the anxiety-related behaviour in their new learning classroom environment. Given the reported links between foreign language anxiety and its ability to inhibit the cognitive learning or production of a second language and students’ ability to reason and plan effectively (Horwitz, 2010), there needs to more recognition of this

concern in the adult learning context and a greater understanding of how, for example, TAFE and other teachers can reduce this foreign language induced anxiety associated with their CALD students.

The issue of foreign language anxiety and cognitive planning has been discussed by Horwitz and his colleagues (Gkonou, 2011; Horwitz, 2010; Horwitz et al., 1986). The relationship between cognitive planning, which is related to metacognition (Zakin, 2007), has also been explored by researchers from the perspective that there may be cultural differences in terms of how different cultural groups develop and display their metacognitive competencies. In particular, Güss and Wiley (2007) opened their research into cross-cultural differences in people's metacognitive processes by noting that metacognition can be defined as "thinking about one's own thinking" (p.1). They also pointed out that although metacognition has been widely studied in the west there has been less research from a cross-cultural perspective. Güss and Wiley studied differences in metacognition across three cohorts in three different countries, India, Brazil, and the United States of America (USA), to identify possible cross-cultural differences in individuals' metacognitive processes. They found differences and similarities in the use of metacognitive strategies used across the three cohorts. One set of findings to come from the study was that there were differences in focus associated with strategy use. They found that speed of thinking was important to the Indians, while the U.S. A. participants rated critical thinking as the most important, and the Brazilians rated synthesis of thinking, above the Indians and the North Americans. Güss and Wiley commented that "apparently the individual skills required for specific metacognitive strategies differ between cultures" (p.20) and so can influence learning.

While there have been studies cited above that have shown cross-cultural differences that relate to CALD students and their inner-speech, there is also a body of evidence related to the difficulties faced by adult CALD learners at the metacognitive level when presented with a new contextual setting. Bell (2007) studied the potential of post-graduate international students to engage in university studies in Australia. She reported that the study looked at self-knowledge, approaches to study, translation of material, the missing of cues, and the evaluation and inferring about course-related reading material. International students who were doing post-graduate studies in their specialist field were reported to be having difficulties with studies when they began their learning in Australia. Bell noted that these students were reading for different purposes in their Australia

university context, compared to their home country university context. They were reading more for examination purposes as they would in their home countries. In their home context passing examinations was very important and so reading to prepare for examinations was important. In the Australian higher educational context the students' reading was designed more to develop a broader content knowledge of their area of study, and to independently read new or related material that was not directly taught by their lecturer. As they became more aware of the contextual differences in the purpose for reading the students reported to have adapted and increased in their level of self-efficacy as Australian university students. Therefore becoming aware of the purpose for reading at an Australian university assisted the students when reading through material, taking notes and in turn increased their sense of self as learners. It is notable that these students were post-graduate and had likely had prior exposure to the academic language of their chosen area of study.

Being aware of the learning content is consider an aspect of metacognition and on this point Davidson and Freebody (1988) stated that metacognition is being aware of "what is required by the context of the person within the context" (p.29). This definition places contextual knowledge at the forefront when attempts are made to be predictive or be analytic about situations. After examining the use of metacognitive processing of indigenous Australians against an Anglo-Australian population, they concluded that contextual knowledge was important when applying metacognitive knowledge to problem-solving. The conclusion drawn by Davidson and Freebody's study points to there being social and cross-cultural differences in the metacognitive knowledge of students about learning. The metacognitive potential of a person to self-regulate and be self-aware are located within the dynamic relationship between the teacher, the student, and the learning context available to them. The suggestion is that understanding the contextual differences across different cohorts of students plays a role in better understanding and interpreting students' learning behaviours and in assisting teachers design more effective instruction for those students.

Memory and metacognition

As ready reviewed the evidence is that people's cognition, memory, and metacognition are all linked (Borst et al., 2010; Swanson et al., 2006), with metacognition also linked to their decision make and planning (Wells, 2012) and people's level of self-

efficacy as learners (Mengelkamp & Bannet, 2010). This interconnection between memory and learning is important and teachers need to proactively organise and present their content to their students in ways that helps their students to understand and process it into their cognitive system (Lövdén, Bäckman, Linderberger, Schaefer & Schmiedek, 2010). As Lövdén et al. noted the use of knowledge, memory, and memory processing efficiency are interconnected and critical for an individual to be a flexible learner. As mentioned Koriat et al (2004) and Shah and Oppenheimer (2008) have argued that in order to cut cognitive load, heuristics and mnemonics help in the organisation of the memory processing and in the metacognitive monitoring of students use of memory and learning strategies.

Summary of theories of social cognition

Vygotsky's (1978) socio-cultural theory proposes that knowledge develops at different levels of a person's cognitive functioning. Gredler (2009) has added that Vygotsky identified the development of a higher-order level of problem-solving that is abstract in nature and develops in older adolescents and younger adulthood. This higher order is related to the individuals' ability to quickly process information because the words and concepts are known and understood. The work of Wertsch (2008) on the development of inner-speech in children suggests that the development of metacognitive judgements are formulated at the social interaction level. From a social cognition perspective cognitive and metacognitive processing can be enhanced when the information is organised into and from the students' long-term memory and the students' language and vocabulary knowledge is strongly linked to that organising of the information (Koriat et al., 2004, Shah & Oppenheimer, 2008).

Factors that create barriers to CALD students' learning

The combination of a new learning context, new social context, and the processing of the language of study can play a significant role in the potential of CALD students to study and learn successfully. The concerns raised about international students coping with studying in Australia are consistent across a range of reports concerning second language learners (Australian Government Department of Education, Employment and Workplace Relations (DEEWR), 2010; Bifuh-Ambe, 2009; Huang & Brown, 2009; Ramburuth & Tani, 2009). In an Australian setting, Ramburuth and Tani (2009) have found that international

students reported that the expectations that teachers place on students to understand what is going on in the Australian classroom to be a major concern. These students reported problems in understanding the content, the expectations, and the procedures of the learning setting. For example, the students were concerned about when was copying from a text book plagiarism, when and how do you ask for help, or support? In a similar study, Huang and Brown (2007) noted that students from other countries were often anxious and wanted to be successful, but did not feel supported. They also noted that language was a communication tool that “permeates all aspects of learning” (p. 184).

Huang and Brown (2009) have shown differences in the way Chinese students perceived the classroom, and functioned within Australian adult classrooms. They reported that when Chinese students were not given opportunities to understand the contextual nature of their learning, the students’ learning potential and achievement were negatively affected. Chinese students were less used to situations in which teachers asked questions of the students, or where they were required to speak in class, or to work in groups on tasks. Group work was not an approach to learning that many Chinese students were familiar with and they perceived a “loss of face” and status if they make a mistake when doing group work (Huang & Brown, 2009). The Chinese students were particularly concerned and anxious about group assignment work that was part of their evaluation and assessment in their course of study.

The claim is that Australian universities are working to be more effective in responding to the concerns of adult overseas students (DEEWR, 2010); Murray 2010). In particular Murray noted an increasing in pre-enrolment English language programs for international students, but he stated there was more needed in what he has called “academic literacy”. The problem is the students’ understanding of the academic content is often inhibited because each subject domain has specific jargon or specialist words that are different from day-to-day conversational language and understanding (Lattuca, 2002). Even if the jargon is known, Bell (2007) noted that the international post-graduate students she studied, from countries such as India and Bangladesh, where English is a high frequency second language, still had difficulties adapting to the Australian dialect of English and academic customs.

Language as a tool of knowledge acquisition for all students

The notion that students' learning and cognitive knowledge is built up over time, such that it is constructed, has generated the cognitive theory called constructivism (Geake, 2009). From this perspective learning is considered to be an active process through which new information is assimilated to other knowledge and information stored in the person's brain (Carlson & Wiedl, 2013). Vygotsky's (1978) view of learning emphasizes the links between environmental, social, cognition, and cultural factors and the individual. From such a viewpoint, Hessel and Hessel-Schlatter (2013) have argued for approaches in educational practices that encouraged students to "learn to think" (p.108). They have suggested that such an approach to teaching assisted students to self-regulate their learning and for the students to be more independent learners. They also suggested that teaching behaviours, teachers' dialogue with their students, and their expectations of their students all play a critical role in the development of students' self-regulation of their learning. They stated "there is a strong link between the teacher's teaching style (more or less metacognitive; that promotes self-regulation or not) and the self-regulation skills in their students" (Hessel & Hessel-Schlatter, 2013, p. 116). Hessel and Hessel-Schlatter, claimed teachers' level and type of dialogue and questioning helped to promote the development of students' self-regulated ability, for instance, questions such as "Have you seen something like that before?" "What should you do first?" and "What do you think would happen if....?"

As discussed already by researchers such as Swanson et al. (2006), the claim is that once second language learners achieved language fluency and a level of mastery of the words and there educational setting, their cognitive processing and memory capacity often matched that of their peers who were not L2 learners. This idea that poor processing of information interferes with comprehension is not unique to just second language learners as outlined in the already reviewed research by Cowan (2004), Woltz (1988) and Hulme et al. (1984).

Language comprehension

Related to this idea, Pearson (2009) and Woolley (2011) have noted that reading and listening comprehension are both significantly impaired when the reader or listener fails to understand 80% or more of the text they are reading or the spoken content they are hearing. Most of the loss of comprehension is associated with one or more of the following:

a lack of prior knowledge; not understanding specific words and their meanings; failure of the reader or listener to make connections among the presented ideas; overly complex sentence structures that could not be readily decoded; pronoun and syntax confusion; and information too cognitively “dense” (too many unfamiliar or new words) (Dewitz & Jones, 2012; Duke et al., 2011; Kucan & Palincsar, 2013).

In a review of the research literature on what teachers in different educational settings can do to enhance their students’ level of written and oral comprehension, Duke et al. (2011) outlined ten evidence based strategies to enhance students’ comprehension. These ten comprehension strategies are:

- build students’ subject content and word knowledge,
- expose students to a volume and range of texts,
- provide students with motivating texts and different contexts for reading,
- specifically teach students strategies for comprehending,
- teach students text structures,
- engage students in discussion about what they have read and listened to,
- build students’ vocabulary and language knowledge,
- integrate reading and writing,
- observe the students as they read and listen and assess and explore difficulties, and
- differentiate student instruction to accommodate a range of students from different social and cultural backgrounds.

Of particular interest to this research with adult CALD TAFE students is the importance that the review by Duke et al. (2011) placed on the need to have teachers build students’ subject content knowledge and word knowledge, and to have teachers explicitly teach students’ strategies for comprehending written and spoken information. These findings by Duke et al. (2011) are consistent with the literature already reviewed in this chapter (e.g., Baddeley, 2004; Kulkofsky, Wang & Hou, 2010; Woltz, 1988) that two of the most important ways in which teachers can assist students’ comprehension of information is to: (1) teach them the vocabulary; and (2) assist students to identify patterns in the information so they can cognitively organise that information into working memory. This focus on vocabulary and having the students’ develop their ability to cognitively organise information is claimed to assist students who are second language learners to

process information and to think in the second language (Pae & Sevcik, 2011; Swanson et al., 2006).

How teachers can effectively assist students to identify patterns in the information has been explored by researchers under the research headings of text structure, top level structure, or main text structures, with the text being the written and/or spoken information. How the information has been organised to achieve a particular purpose or meaning by the writer or the speaker is also important (McNamara & Kintsch, 1996; Meyer, Brandt, & Bluth, 1980). The five common top level or main text structures are: (1) description (listing), (2) time order, (3) comparison and contrast, (4) cause and effect, and (5) problem and solution (Kucan & Palincsar, 2013). The writing and reading comprehension strategies of comparison and contrast; cause and effect; and problem and solution are considered higher-order cognitive strategies that require the student to have an understanding of the vocabulary in the text and the ability to connect two or more thoughts together at the same time (Dewitz & Jones, 2012; Hall, Sabey, & McClellan, 2005). The suggestion is that CALD students are more likely initially to find the use of these higher-order strategies difficult and that they may need more mentoring and support to use them in their writing and in comprehension of written text, (Houghton, & Bain, 1993). Once mastered, however, these text strategies facilitate students' performance in educational settings (Mercer & Littleton, 2007).

Although it is not the intention of this study to repeat the research on the effectiveness of teaching text structures to CALD students, there is interest in reviewing effective strategies in more detail. Marion Blank (2002) identified a sequential hierarchal set of cognitive skills, focussed on listening in an instructional context. Blank's research will be reviewed in more detail in the next section, but before this it is worth noting that Blank's research and that of Meyer (Meyer et al., 1980) have similarities. Both have listing or description as the initial strategy followed by progress to comparison and contrast, and hence to problem-solving. To help conceptualise the text structures, the following table has been adapted from that developed by Duke et al. (2011). It is an example of a possible unit of work for upper secondary students about farming in Australia. The table illustrates the five common text-based analysis strategies and how these can be incorporated into a teaching and even an assessment program of instruction.

It is suggested that when students identify such text structures they gain a greater understanding of the information in the text and are able to recall and think with that information to a higher standard which supports the students' metacognitive judgement for

that text and how the text is constructed (Dewitz & Jones, 2012; Hall et al., 2005). In addition, if teachers use these key text structures to organise their instruction to their students, the students demonstrate greater comprehension of what the teacher is saying to the students and as a result the performance of the students is enhanced (Kucan & Palincsar, 2013; Meyer et al., 1980).

Table 2.1

Example of the five text structures identified as assisting students' comprehension (after Duke et al., 2011).

Text structure	Sample questions	Topic sample	Key words and word cues	Sample activities
Description listing	Describe the farm buildings and animals	Describe a dairy farm	characteristics identify describe	Have students visit a farm and take pictures and then write a descriptive piece on what they have seen.
Time order	When did this happen? What happened after this?	What has to happen in a normal day?	when before after then	Have the students write a monthly diary of being a farmer.
Compare and contrast	How are things alike and different?	How has farming changed over the last 100 years?	both, alike, unlike, but, however, than, change different	Read through an extended reading passage about change in farming practices. Make two lists about what happened in the past and what happens now.
Cause and effect	What caused this?	What happens to the farm when there is a drought	because, therefore, cause, effect, so	Read an extended passage about how rainfall change has influenced farming.
Problem and solution	What went wrong and how it was or could be fixed?	Dairy farmers are not getting a good price for their milk what can be done	because, in order to, so that, trouble, if, problem	Review newspaper articles over the last six months about the problems of milk prices, summarise these and write your own passage.

Both Duke et al. (2011) and Kucan and Palincsar (2013) at the conclusion of their extensive review of the literature have argued that more research needs to occur in the following areas:

- (1) How to better assist students with their comprehension of classroom instruction and of text material that the students are expected to read and to be assessed on.
- (2) Identifying best practice using case studies of effective teachers in different settings and with different cohorts of students adapting their program to systemically enhance the students' understanding of different texts and forms of instruction.
- (3) Examining the knowledge teachers need in order to engage in specific practices that are supportive of students' comprehension of presented information.
- (4) Evaluation of innovative approaches to professional development of teachers in the delivery of their content to their students.
- (5) Investigating the impact of teacher-specific professional development models on students' reading and listening comprehension growth.

This call by Duke et al. (2011) and Kucan and Palincsar (2013) for more research on particular teacher pedagogical strategies to assist students' literacy development has implications for this research study, which is focussed on adult CALD students in the Australian TAFE sector. Given that research findings on text structures as a way of facilitating students' reading and comprehension of text have been investigated for some time (Dewitz & Jones, 2012; Hall et al., 2005; Kucan & Palincsar, 2013; Meyer et al., 1980) and with ESL and CALD students (Houghton & Bain, 1993), it is surprising that so little research has been reported or conducted in the domain of dialogue strategies that facilitated CALD students' comprehension of instruction. This point was also identified by Mercer and Littleton, (2007) in their review of the needs of students from ESL backgrounds. This is not to say that there are not dialogue strategies that have been researched, but what has been reported and developed has been more focussed on the acquisition of children's initial language (Blank, Rose, & Berlin, 2003; Mercer & Littleton, 2007), although the same strategies have been explored with adolescent students and as ways to facilitate students' learning (Blank & Franklin, 1980; Paul, 2007). The issue is adult students with second language difficulties have received less research attention in terms of teacher pedagogical strategies and dialogue strategies.

Returning to the claim of Duke et al. (2011) that there is a need for researchers to examine the knowledge that teachers need to engage in specific practices that are

supportive of students' comprehension of presented information, one suggestion is that research into dialogue based strategies needs to be undertaken. What these dialogue strategies are and how TAFE teachers can be taught strategies to facilitate the learning of CALD students in their classroom is one aspect of the current study.

Hay, Fielding-Barnsley and Taylor (2010) have investigated the use of Marion Blank's (2002) dialogue and questioning strategies with teachers to advance younger children's language acquisition and to advance the children's learning in the classroom. The issue for this current study is that although these strategies have been demonstrated to be effective in one educational context, early schooling, the extent to which they might be effective for facilitating TAFE teachers to accommodate CALD students more effectively in their classrooms, is unknown.

Blank and her colleagues have strongly advocated for the need for teachers to adapt and modify their dialogue with students to enhance the students' comprehension of instruction (Blank, 2002; Blank & Franklin, 1980; Blank, Rose, & Berlin, 1978). In particular, Culatta, Blank and Blacks (2010) have pointed out that teachers' questions can build on students' levels of prior knowledge and help the students' organise their thinking about the information presented. They claimed that teacher's questions can be used to motivate students to be more engaged in their own learning and that by using different levels of discussion and reasoning-based questions the teacher can advance their students' thinking and hence their responses to questions. This approach sets up a learning dialogue where a teacher's questions promote students' learning, and helps the teacher to organise the content and language of instruction to their students. In this light, teachers' language of instruction is a tool that can be used to help construct students' learning and thinking.

Blank's dialogue strategies

Blank et al. (1978) proposed four levels of dialogue complexity. The four basic levels of questions and interactions are outlined in terms of their complexity in Table 2.2. Teachers and students are partners in a dialogue in which the teacher crafts the question to suit the students' levels of development. Students respond in ways that are increasingly linguistically complex. Students who have not yet mastered the lower levels of questions, such as not being able to describe an object, are more likely to have difficulty when higher level questions are posed (Blank, 2002; Blank & White, 1999; Elias, Hay, Homel, & Freiberg, 2006). Teachers can use the levels of questioning flexibly, moving up and down

the levels as appropriate to introduce, review, and set up new learning situations (Hay & Fielding-Barnsley, Taylor, 2010). These studies, however, have all occurred with young children, and the effectiveness of such an approach with CALD young-adult students has not yet been studied.

Table 2.2.

Blank's four levels of language complexity

Level of Complexity & Proficiency	Language Complexity to the Experience	Example of Teacher Discourse
1	Directly Supplied Information (Characteristics)	What do you see?
2	Classification (Selective analysis of experience)	Group the shapes by colour. How is this different from this?
3	Reorganisation (Reordering the experience)	Re-tell me the story. What is your experience with this topic?
4	Abstraction and Inference (Reasoning about the experience)	What made it happen? Why do they do this?

From Vygotsky's (1978) perspective, the three elements that Blank (2002) is organizing into a hierarchy are: (i) language proficiency; (ii) social skills proficiency; and (iii) reasoning proficiency, which are considered to be related because they stem from a common underlying cognitive source that manifests all three proficiencies. It is speculated that the core cognitive proficiency of language and reasoning is working memory (Baddeley, 2007) along with processing speed and capacity (Goswami & Bryant, 2007). From this perspective, people's reasoning, language, and social development cannot be easily separated from their ongoing and developing cognitive skills to store, organize, and retrieve information in long-term memory (Baddeley, 2007; Enfield & Levinson, 2006; Hattie, 2009). This cognitive enhancement of the individual is considered to continue throughout the life-long learning process (Paul, 2007). There is on-going cognitive research by Lövdén et al. (2010) in support of this perspective which noted that a person's language usage, knowledge, memory, and processing efficiency are all highly

interconnected within a person's brain functioning. This interconnection is critical for an individual to be a flexible learner and problem-solver. Hence, Blank's (2002) framework should also have application with adults because it is based on Vygotsky's (1978) cognitive, social learning theory, which has application across the life span (Phillipson, Ku, & Phillipson, 2013). To date, however, there has been little research that has applied Blank's framework to adults.

Summary

This review has considered a number of aspects of learning that can have an impact on young adult CALD students in an Australian TAFE setting. Arising from this background, three interlinked studies were devised to consider the impact of socio-cultural factors on CALD students' education, and to investigate an intervention based on teachers using dialogue strategies to better organise their delivery of content to the students so the students were better able to reason with that delivered content. This study is unique in that it examines how CALD TAFE level students perceive their potential to apply problem-solving strategies in three situations (practical, interpersonal, and study) in a culturally new educational setting, while also examining the interaction of perceived problem-solving with learning style (individualist or collectivist). Teachers were also asked to respond to a questionnaire about their perceptions of CALD students as problem-solvers using questions structured around Blank et al. Levels of Questioning (Blank, Gessner & Esposito, 1979). Following these two studies of CALD students' and their teachers' perceptions of their problem solving approaches, an intervention study was designed as a proof of principle study using Blank et al. questioning in TAFE classrooms, extending the use of this approach from the early years classroom to an adult classroom setting. The next chapter provides an overview of the three studies.

Chapter 3: Rationale for the study

A core purpose of this research is to respond to the recent articulated need for more research on how TAFE Australia can enhance its pedagogical knowledge and pedagogical practices and have a better understanding of the learning needs and styles of its CALD students (e.g., Hellsten, 2008; Marginson, 2007; Smith, 2010; TAFE Directors Australia, 2011; Tran, 2011; Tran & Nyland, 2013). Achieving this knowledge requires specific research that is designed for TAFE students who come from a CALD background (TAFE Directors Australia, 2011; Tran & Nyland, 2013). Although it is acknowledged that there is a body of research that has investigated the problems international students have when studying in countries other than their home country (Bifuh-Ambe, 2009; Hellsten 2008; Murray, 2010; Ramburuth & Tani, 2009), there is less research on how international and particularly Asian students' learning styles fit with the Australian TAFE context that is described as Western ethnocentric (Marginson, 2007; Smith, 2010), or what can be done to enhance TAFE teachers' pedagogical knowledge and pedagogical practices associated with international and CALD students (Marginson, 2007; Smith, 2010; TAFE Directors Australia, 2011; Tran & Nyland, 2013; Tran, 2011). As noted by Bifuh-Ambe (2010), there is still limited information available that would help international students at tertiary level acquire skills to cope in mainstream university settings and similar settings. There also appears to be a limited amount of research conducted into what teaching interventions would assist students of CALD background learning in mainstream classes at TAFE level. In particular, there does not seem to be a great deal of research about interventions in mainstream classrooms that teachers at TAFE level can use to assist CALD students with their learning.

Murray (2010) contended that the DEEWR (2009) report into teaching English to international students at the tertiary level does not do enough to put in place programs that would assist students' learning. He states that there are three areas in which English language proficiency might assist students. These areas are English language proficiency, academic literacy, and professional and social communication skills.

Writers such as Murray (2010) and Ramburuth and Tani (2009) have identified that in the Australian higher educational experience, international students need to be provided with access to English language knowledge that is beyond training in grammar. They

maintained that language education needs to include providing students with the means to be successful independent learners in an Australian higher educational environment. Murray recommended the introduction of a wide reaching training program in academic skills that goes beyond training in English grammar to include academic literacy training and professional communication that are “imbedded in the curriculum” (p. 59). This current study is supportive of Murray’s call for an intervention at the classroom level because it empowers the mainstream classroom teacher and it provides the students with an intervention process that is directly linked to the students’ learning needs.

As the review has revealed there are a number of researchers who have shown that problem-solving can be an issue in a new learning context. Hence the focus of this research at the TAFE level is how CALD students perceive themselves as problem-solvers, and how their mainstream classroom teachers also perceive them as problem-solvers. Bifuh-Ambe (2010) has argued that CALD students at higher education levels are successful when they are able to use metacognitive strategies when learning. While Bifuh-Ambe provided valuable insight into the learning of a post-graduate international student, she did not directly examine approaches to teaching that would assist mainstream teachers about how to teach CALD students. The research focus of the current study is on a vocational level training institution whose CALD student population is more diverse and might include overseas professionals who have migrated to Australia and are doing a course to gain local knowledge, migrants who wish to get a Diploma in an area of study so that they can then look for work in that area, international students doing TAFE level Diplomas with the idea of going onto further study at university, and international students who only wish to complete Diploma level studies. Rather than focus on a particular cohort of students as illustrated by Bifuh-Ambe (2010), the research is looking for a more representational sample of CALD background students who attend TAFE mainstream courses.

The three inter-related studies

The current research is made up of three connected studies that systematically investigated the perceptions of CALD TAFE students of their learning styles and problem-solving techniques; the perception TAFE teachers have of CALD TAFE students as learners and problem-solvers; and the effectiveness of Blank et al. (1978) Levels of

Questioning as a focused teacher pedagogical intervention to enhance the learning of CALD TAFE students.

Study 1: CALD students' perceptions of themselves as problem solvers

Study 1 was informed by the Socio-Cultural Theory (SCT) of Vygotsky, which takes the stance that cognitive development is an internalized development process and is influenced by cultural tools such as language (Damianova & Sullivan, 2011). In this context, language and thinking are linked and language is related to problem-solving (Gredler, 2009). How international students perceive their problem-solving skill was investigated using three levels of problem-solving (practical, interpersonal, and study). Second, the study examined cultural influences on learning style; and thirdly, how problem-solving approaches and learning styles influence CALD students' problem-solving in Australian TAFE education.

Study 2: Teachers' perceptions of CALD students' problem-solving in an Australian education setting

In Study 2, teachers were surveyed using a questionnaire that embraced Blank et al. (1978) Levels of Questioning. Although these levels of questioning have been used with children, they have not been used with CALD adults (Hay, Callingham, & Wright, 2013). When considering language within the sociocultural context, if CALD students are unable to understand the language of instruction then their learning is likely to be impaired.

The questionnaire provided insight into teachers' perceptions of how well CALD students' cope with academic studies and the ability of these students to use and understand instructions. This approach is different from others in that it seeks information about the levels of problem-solving of CALD students as perceived by teachers and not just information about CALD students having problems with study in an Australian educational context.

Study 3: Incorporating dialogue strategies to enhance the learning of adult CALD students

Study 3 uses Blank's Levels of Questioning as an intervention with CALD students in mainstream TAFE classrooms. Specifically, the intervention is used to see if second language learners in mainstream classrooms respond to Blank's (2002) dialogue strategies.

Summary of the three studies

In summary, the first part of the research asked CALD students how they perceived themselves as problem-solvers in an Australia TAFE educational setting; the second part of the research asked TAFE teachers how they perceived CALD students as problem-solvers in an Australian TAFE Diploma level course, as well as the students ability to handle the levels of Blank's dialogue strategies. The third part was to introduce the TAFE teachers to Blank's (2002) strategies and to see if using these strategies enhanced the learning of CALD students.

How socio-cultural theory informs the current studies

In the process of scaffolding students learning as articulated by Vygotsky(1978) through the use of Blank and Franklin's (1978) Levels of Questioning, it was anticipated that CALD students would be able to develop a lexicon of words and concepts that enhanced their learning. In the process of developing this knowledge, it is posited that students are able to become better mediators of their own learning, rather than being reliant on external mediation by teachers. This shift in mediation should allow CALD students to focus more on the meaning of instruction and concepts presented in mainstream classes. A consequence of this would then be that students are not burdened by a cognitive load that is weighted down by translating words before any other cognitive processing of classroom activity can take place (Hester & Garavan, 2005).

Blank and White (1999) discussed the difference between classroom discourse and that discourse that takes place between two people. Classroom discourse uses specific language associated with the academic content. Lundberg (2002) has identified that language is used in different types of communication; for example, there are differences between social conversation and academic discourse. Clark and Flores (2007) pointed out that when learning in a new culture the individual must learn the knowledge that is present in that new culture and integrate that with existing knowledge. The CALD student is faced with interpreting a second language, but also has to become aware of how to communicate in the language of a culturally different classroom. The adult mainstream classroom is likely to be a specialist area that has a specialist language. So, the culture of the specialist area speaks to the listener, but in the language of the specialist area. The spoken language is English, but the words and concepts are part of the culture of the specialisation (Hatano

& Wertsch, 2001). The student has to work out the meta-linguistics of the specialist area to be able to communicate in the specialisation.

Blank's (2002) four levels of questions (1 – Matching experience, 2 – Classification, 3 – Reorganisation, 4 – Abstraction and inference) provide a means of operationalizing the socio-cultural research paradigm and could provide an effective means by which the potential of CALD students to decode abstract questions could improve. This study focused on examining CALD students' potential to develop abstract language from a socio-cultural context.

Blank and White (1999) have identified that a group conversation is complex because the listener has to decode meaning without the ability to interpret and have the interpretations checked, as would occur in a one-to-one conversation. The teacher is communicating to a large number of listeners who might interpret the utterances in different ways to those intended by the teacher. Blank and White indicated that teachers often ask questions that assume knowledge of the activity or topic. If abstract questions are asked of students who are not aware of specialist meanings of words or concepts, then it is likely the students will not be able to engage in learning. The students are not in a position to make interpretations about information because they are not decoding the text. The use of Blank's level 2 questions (classification) could provide a platform for the development of declarative knowledge, that is, knowledge that is publicly accepted, about the area of study (Blank & White, 1999). The classification of words and concepts provides the CALD learner with the opportunity to reduce working memory load related to interpreting words and provides the CALD student with the chance to focus on classroom tasks. Critically, the decoding of words and concepts allows the student to begin to develop higher order thinking about a topic. Until knowledge is reorganised (level 3) into long-term memory, then the development of abstract and inferential thinking (level 4) is not likely to take place (Blank, Rose, & Berlin, 1978). As Efklies (2008) has noted, the development of declarative knowledge is argued to be integral to the development of metacognition. The CALD student needs to integrate existing declarative knowledge in long-term memory together with new declarative knowledge to be able to develop abstract thinking in a new cultural setting. Focusing on level 2 and level 3 questions will support development of the reorganisation of declarative knowledge in long-term memory, providing a foundation for abstract thought.

The previous chapter provided an overview of the three linked studies and a theoretical rationale for the approach. The next chapter provides the methodology and findings from Study 1: CALD students' perceptions of themselves as learners and problem-solvers; and Study 2: TAFE teachers' perceptions of their CALD students as learners and problems-solvers. These two studies then informed an intervention, Study 3. Study 3 will be considered in chapter 5.

Chapter 4: Methodology and Results of Study 1 and Study 2

This research consisted of three linked studies, with each of these studies being embedded in socio-cultural theory. The previous chapter provided an overview of the three linked studies and a theoretical rationale for the approach. In this chapter the methodology and results from Study 1: CALD students' problem-solving approaches and learning styles and Study 2: TAFE teachers' perceptions of CALD students as problem-solvers will be examined. Study 1 received ethical approval from the University of New England, which was transferred to the University of Tasmania (Approval number H0010465) and Study 2 was conducted as a separate study with approval from the Human Ethics Committee at the University of Tasmania (Approval number H0010466) (Appendix A shows the information sheets and consent forms for the studies). In Study 1, students of CALD background were surveyed about their perception of their own problem-solving approaches and learning styles in Australian TAFE classrooms. In Study 2, TAFE teachers were surveyed about their perceptions of CALD students as problem-solvers in an Australian educational setting. Study 3 will be considered in chapter 5.

Study 1: CALD students' problem-solving approaches and learning styles

This study investigated how CALD students perceived themselves as problem-solvers under three conditions (interpersonal, practical and study conditions). The study also investigated the preferred learning style of CALD students, based on a collectivist and individualist model of cultural differences. Specifically the question that is examined is "How do CALD students perceive their problem-solving skills in an Australian education setting".

Sample

Participants were sought from Certificate 1V English Language classes and Diploma level mainstream TAFE classes made up of CALD students. All of the participants had achieved a level of English that was equivalent to level 5.5 or 6 as measured by the International English Language Testing System (IELTS) score. This placed them as Moderate to Competent English language users.

The participants were made up of 46 females and 33 males, with two participants not indicating their gender. The age range was between 20 years and 66 years. In response

to the question “Have you ever lived in a country other than Australia or your home country” 70.4% (57/78) of participants indicated they had not lived in another country before coming to Australia, whereas nearly one-quarter 24.7% (20/78) reported they had lived in another country. Three participants did not provide a response. When asked “Would you describe yourself as having a lot of experience of other cultures” 48.1 % (39/79) of participants reported they had no cultural experience, whereas 49.4% (40/79) reported they had experienced other cultural settings. Two participants did not provide a response.

In response to the question “How many other countries have you lived in” 28.4% (23/81) of participants reported they had lived in other countries. The data suggests three participants have provided a different response to this question than they did to the question which asked had they lived in a country other than Australia or their home country. There was some variation in the length of time participants had lived in different countries. Table 4.1 displays the length of time participants reported to have lived in another country.

Table 4.1

Length of time participants spent living in another country.

Time in months	Number of participants	% of participants
1 to 3	3	3.7
3 to 6	6	6.2
6 to 12	3	3.7
12 to 24	1	1.2
24 or more	9	11.1
Total	22	25.9

Given that the largest proportion of students (9 participants or 11.1%) of this population had lived in a country other than their home country for more than two years, it seems that CALD students in the Australian TAFE sector may have some experience of living in another country, and hence have experienced different cultures.

Table 4.2 describes regions that participants came from. Participants came from a number of countries because the purpose of the study was not to investigate a single group, but rather to identify how TAFE level CALD students perceived their experience in an Australian education setting.

Table 4.2

Regions from which participants came

Region	Student numbers	Female	Male
Southern Asia	35	24	11
South East Asia	12	9	3
Africa	9	5	4
South America	4	2	2
Eastern Europe	3	3	-
Middle East	1	1	-
Sub-continent	15	6	9
Other	2	2	-
Total	81	52	29

Note: Southern Asia= Japan, Korea, China region; South East Asia= Vietnam, Cambodia, Laos; East Europe = Russia, Poland; Middle East= Lebanon, Iran, Iraq; Subcontinent= India, Pakistan, Sri Lanka.

Instruments

The instruments used in Study 1 are provided in Appendix B.

The Preferred Learning Style Questionnaire (PLSQ)

The purpose of the PLSQ was to provide an indication of students' individualist and collectivist thinking. The PLSQ was adapted from a 32 -item instrument designed by Singelis, Triandis, Bhawuk, and Gelford (1995). The device measured Horizontal Individualism (HI), Vertical Individualism (VI), Horizontal Collectivism (HC) and

Vertical Collectivism (VC) as described by Hornik and Tupchiy (2006). The items in this instrument focused on individualism and collectivism in the workplace.

Questions were modified slightly to provide items focused on an educational environment. Boyle (2013) noted that there was little evidence to support learning styles per se, but also that there is evidence supporting differences in learning related to prior learning and background knowledge. The focus of the PLSQ is on prior learning experience. The HI, VI, HC and VC groups each used four items. Examples of the items are shown in Table 4.3.

Table 4.3.

Examples of HI, VI, HC and VC items from the PLSQ

Dimension	Item example
Horizontal Individualist	I enjoy doing tasks differently from other people
Vertical Individualist	Competition makes me work harder
Horizontal Collectivist	Harmony is very important when you are learning
Vertical Collectivist	I think the group needs come first

The PLSQ was administered individually using pencil/paper and took participants approximately 20 minutes to complete.

The Preferred Way of Problem Solving (PWPS)

The Preferred Way of Problem Solving (PWPS) questionnaire was adapted from an instrument by Güss and Wiley (2007). Although there is limited psychometric information about the instrument, it was used by Güss and Wiley to investigate metacognitive processing across cultures and Antonietti, Ignazi and Perego (2000) used a similar approach to the PWPS in a business setting.

The PWPS used in this study differed from the device used by Güss and Wiley (2007) in that it was adapted to focus on an educational setting, whereas the device used by Güss and Wiley asked specifically about problem-solving in a business setting. Participants were asked to choose a preferred mental strategy before going on to respond to three conditions in which the approach might be used. Whereas the Güss and Wiley

device asked about preferred strategy last, in this study participants were presented with this question first. The intention behind changing the order of the questions was to help respondents focus on the strategy in an educational setting.

Participants completing the PWPS were asked to read the introduction and keep in mind the description given in the introduction as they completed the questionnaire. The questionnaire was made up of four questions. Question one asked participants to consider, out of a list of eight attributes—creativity, speed, critical thinking, synthesis, accuracy, memory, analysis, and logical thinking—which they considered was their preferred approach to problem-solving. After considering the preferred problem-solving approach, participants were then asked to consider the use of that problem-solving strategy under three different conditions (interpersonal, practical, and study). Under each condition, participants were asked to rate on a Likert scale (Not a Lot = 1 to 4 = Very Often) three questions;

How often would the strategy be used?

How useful do you think the strategy is?

How easy do you think the strategy is to apply?

The PWPS was administered in a paper-based format individually. Participants took approximately 20 minutes to complete the questionnaire.

Procedures

Teaching Centres in two large metropolitan TAFE located in Melbourne were approached and the Teaching Centre Managers (TCM) were given an explanation of the research project. After gaining the TCMs' permission, the researcher explained the project at teachers' staff meetings. Teachers were asked to allow the researcher to come to their classes and explain the project to CALD students. The teachers advised the researcher of their willingness to take part in the study by email. After permission was received from teachers, the researcher was introduced to classes of CALD students and the study explained. Packages containing an envelope, a plain language statement, a permission form for participants, a demographic details questionnaire, the copy of the PLSQ and the PWPS were left for those students willing to participate in the study to take and complete. Participants filled out the forms and mailed the data back to the researcher using a stamped envelope included in the package. Participants placed personal details in a second envelope

that was separated from the responses to the questionnaire. Personal information was kept separately from completed questionnaires.

Analysis

Item response modelling, and in particular Rasch measurement, was used to analysis the data (Bond & Fox, 2007). The Rasch modelling process provide the means to develop interval scale data from ordinal data by constructing a map of the probability of participants' potential to endorse survey items (Bond & Fox, 2007). The unit of measure is called a logit and is defined as the logarithm of the odds of success on a particular item (Bond & Fox, 2007). In Rasch measurement, the fit of the data to the model provides a quality control function. Rasch models are underpinned by three assumptions: 1. All the items address a single underlying construct in a consistent way; 2. The measure of endorsement is additive and an increasing value indicates a stronger endorsement of the item; and 3. Each item is independent of every other item. When the data fit the model, the underlying assumptions have been met and a single unidimensional construct is measured. Fit measures are reported for each item as well as for the overall scales. Accepted measures of fit for the weighted Infit Mean Square (IMS) values are 0.7 to 1.3, with standardized values (ZSTD) between ± 2 (Bond & Fox, 2007). In Study 1, three scales were analysed: the PWPS, the PLSQ, and a "thick" construct of the Preferred Approach to Study scale was created from combining both the questionnaires.

The Rasch person measure score provided interval data for each person from the, PWPS Questionnaire, the PLSQ and the Preferred Approach to Study scale derived from the merging of scores from the two questionnaires. These measures were used for within- and between-groups analyses using standard analytical techniques such as *t*-tests and ANOVA.

Results: Study 1

The results section will report on the findings from the PLSQ followed by the PWPS and then the Preferred Approach to Study scale. The results will be presented in the following manner for both the PLSQ and the PWPS. The first set of results will provide the means and standard deviations for the PLSQ items in the scale. Then a table will be provided that describes the item infit statistics for the PLSQ, and the PWPS, that will be followed by a "bubble chart" (Bond & Fox, 2007) which provides a visual display of the item infit and measurement error for each item in the scale. Finally, the item map will be

displayed which provides a visual display of the person and item distribution along the vertical axis, the logit scale. The results of the Preferred Approach to Study scale will be reported last using the same approach to reporting as has been described above.

Results of the Preferred Learning Style Questionnaire (PLSQ)

Table 4.4 shows the means and standard deviations for each of the items from the PLSQ scale. Item PLSQ 14 “*I hate disagreeing with others in the group*” has a small standard deviation. This suggests that this item’s dispersion from the mean is small, showing a tendency toward kurtosis, or “peakiness”.

Table 4.4

Means and SD of Items from the PLSQ-

Item from the PLSQ	N=81	
	Mean	SD
1.I like to do work by myself	2.8	0.9
2.When I am successful in my learning it is because of my efforts	3.2	0.9
3.I enjoy doing tasks differently from other people	2.8	0.9
4. I like my privacy when studying	3.0	0.9
5. When people in the group do better than me I need to work harder	3.2	0.8
6. Competition between classmates is good for the group	2.9	1.0
7. It is important to me to be the top of the group	2.6	0.9
8. Competition makes me work harder	3.0	0.9
9. I am proud when members of my class get good results	3.3	0.7
10. Harmony is very important when you are learning	3.4	0.7
11. I like to share things with my classmates	3.3	0.7
12. When doing a group activity I assist others as much as reasonably possible	3.4	0.6
13. I think the group needs come first	3.2	0.7
14. I hate disagreements with others in the group	2.3	0.09
15. I think I should consider group needs over mine	2.8	0.8
16. I should consult with the group before doing a task	3.1	0.7

Fit scores are expected to be within the conventionally accepted estimate between ± 2 for the ZSTD statistic which has a mean of 0 (Bond & Fox, 2007). Table 4.5, The PLSQ Item Infit Order table shows that all the items fit within ± 2 which suggests that the items fit is within conventionally accepted limits.

Table 4.5

PLSQ Rasch Item Infit Order

PLSQ item	Infit	
	MNSQ	ZSTD
14) I hate disagreeing with others in the group	1.2	1.9
7) It is important to me to be the top of the group	1.1	1.1
1) I like to do work by myself	1.1	1.0
4) I like my privacy when studying	1.1	1.2
16) I should consult with the group before doing a task	1.1	0.7
15) I think I should consider group needs over mine	1.05	0.4
6) Competition between classmates is good for the group	1.05	0.4
3) I enjoy doing tasks differently from other results	1.01	0.2
9) I am proud when members of my class get good results	0.9	0.0
2) When I am successful in my learning it is because of my efforts	0.9	-0.5
11) I like to share things with my classmates	0.9	-0.5
12) When doing a group activity I assist others as much as reasonably possible	0.9	-0.4
10) Harmony is very important when you are learning	0.9	-0.2
5) When people in the class do better than me I need to work harder	0.8	-1.1
8) Competition makes me work harder	0.8	-1.1
13) I think the group needs come first	0.8	-1.1

Figure 4.1 provides a visual display of the item infit in relation to the logit scale scores. The circles represent items and the size of the circles displays the measurement error, that is, the precision of each item. The fit of the items is measured on the horizontal axis. Items lying outside ± 2 show overfit and underfit of items to the Rasch model (Bond

& Fox, 2007). Zero on the horizontal axis indicates the perfect Rasch model response, so the closer to zero item responses are the better the actual item fit is to the ideal Rasch model. The overfitting items are those that are too predictable and are found on the left of the chart. Underfitting items are found to the right of the chart; these items are too unpredictable, or random. It can be seen that only PLSQ14, “*I hate disagreements with others in the group*”, is close to the limit of ZSTD. The chart shows that all the items are working together to measure the underlying construct, Preferred Learning Style, in a consistent fashion.

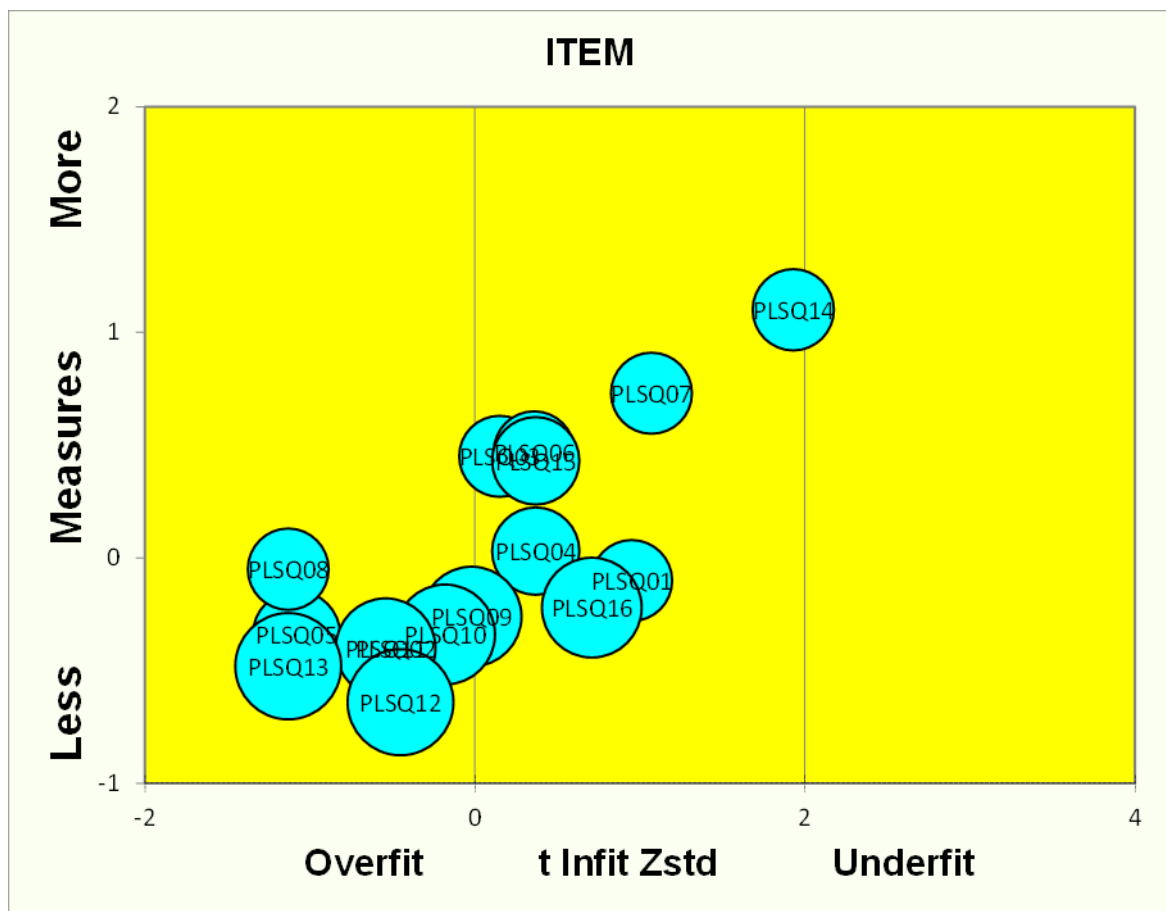


Figure 4.1. PLSQ Bubble Chart showing the location of the items in relation to the latent Preferred Learning Style variable and the measurement error estimate, shown by the size of the bubble (Linacre, 2011).

Figure 4.2 shows the Item Map for the PLSQ, which provides a visual display of the relationship between persons and the item responses. Rasch analysis places the respondents and the items on the same measurement scale so that each person's average response to the set of items is measured on the left side of the vertical line and the items are shown on the right hand side. The item mean is set at zero, and the easier to endorse

items sit below the item mean and the harder to endorse items fit above the item mean. The logit—the logarithm of the odds of success—is the unit of measurement of the Rasch model. M represents the mean logit value of Persons (on the left) and Items (on the right) and S and T represent one and two standard deviations away from the mean.

The hardest item to endorse was item PLSQ14, “*I hate disagreeing with others in the group*”, which asks about collectivist ways of learning. The next three items that were difficult to endorse were, however, from the individualist group of items. The most easily endorsed items were from the collectivist group of items. The items that cluster around the item mean reflect both individualist and collectivist items.

No clearly discernible pattern emerged of preferred learning that was collectivist or individual—vertical or horizontal. The vertical collectivist is defined as reliant on the group and the horizontal collectivist is defined as being part of the group, but also not being subordinate to it. Vertical individualists are focused on winning, believing competition is part of natural law, and comparing themselves to others. The horizontal individualist is interested in self-expression and not comparing themselves to others (Hornik & Tupchiy, 2006).

In summary, other than PLSQ14 “*I hate disagreeing with others in the group*”, which is collectivist, the most difficult to endorse items were individualist, both vertical and horizontal, and the most easily endorsed items were collectivist. Overall, the results suggest participants were largely collectivist in learning style. In general, respondents found the items relatively easy to endorse, shown by the difference between the item and person means, and the distribution of persons relative to items shown in Figure 4.2.

Although the participants showed a preference for being collectivist in their responses, they also showed individualist interest in working hard and perceived themselves as achieving good results through their own effort, an individualistic response. Huang and Brown (2009) reported that Asian students did not like to work in groups and that they preferred working on educational tasks individually. Although collectivism might be endorsed in the context of the classroom behaviour, CALD students might also be influenced by individualist perceptions of achieving in educational settings.

Further to this, as international students who have had to pay for their place in an educational setting, or as migrants who see their future as linked to achieving in the new country's education system, the need to achieve could also be fuelled by individualist drives. Komarraju and Cokley (2008) reported that individualism and collectivism cannot be seen as "bipolar dimensions" (p.445) and that there are differences across cultural groups in what is perceived as collectivist and individualist.

The results of the current study support some of the findings of Hornik and Tupchiy (2006). They have reported that the horizontal collective group was positively associated with a sense of community and social presence in a technology mediated learning environment. The indications are that collectivism was the preferred approach to learning reported in the current study, while students have also indicated they saw doing well in their studies as a result of their own efforts.

Results of the Preferred Way of Problem Solving (PWPS) questionnaire

The purpose of using the PWPS was to investigate CALD students' perception of themselves as problem-solvers in an Australian adult educational context. Participants were asked to consider, "How useful", "How easy to apply", and, "How often" their preferred approach to problem-solving was used in an Australian educational setting under three conditions, practical, interpersonal and study.

Table 4.6 shows the item fit order for scores for all of the PWPS items.

Table 4.6

Rasch PWPS item infit order

Item	Infit	
	MNSQ	ZSTD
4b)How useful do you think the strategy is (study)	1.5	2.8
4c)How easy do you think the strategy is to apply (study)	1.1	0.8
2b) How useful do you think the strategy is (interpersonal)	1.0	0.4
2a)How often would you use the strategy (interpersonal)	1.0	0.1
3a)How often would you use the strategy (practical)	0.9	0.0
4a)How often would you use the strategy (study)	0.9	-0.5
3c)How easy do you think the strategy is to apply (practical)	0.8	-1.0
2c)How easy do you think the strategy is to apply (interpersonal)	0.8	-1.0
3b)How useful do you think the strategy is (practical)	0.7	-1.4

The item PWPS04b “*How useful do you think the strategy is (study)*” does not fit within the accepted infit range, whereas all the other items fit within ZSTD ± 2 , which suggests that the item fit is sound for items other than PWPS04b.

Figure 4.3 (The bubble chart) of the PWPS Rasch analysis displays the item measure, item fit and precision of the items. The bubble chart of responses to the PWPS shows that all items fit is within the parameters of the Rasch model, except for item PWPS04b. The underfit of this item shows that the item is unpredictable in relation to the expected Rasch model.

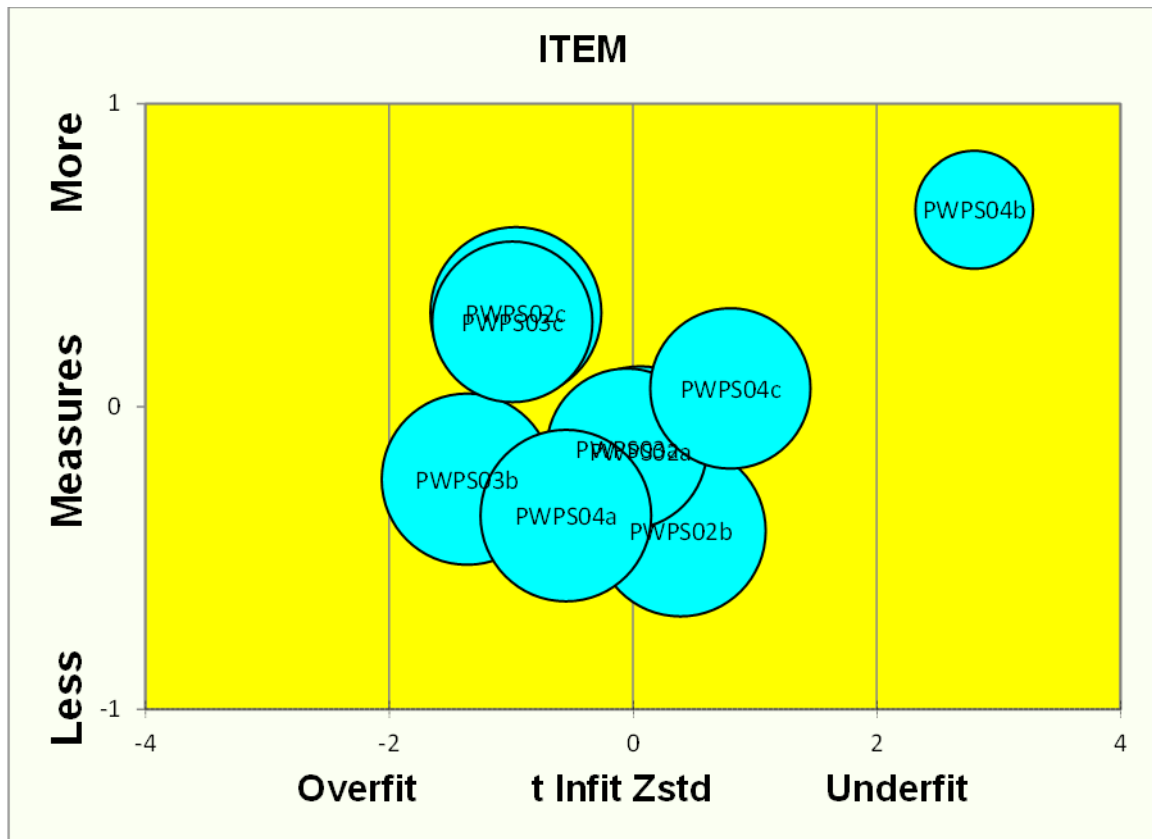


Figure 4.3. PWPS Bubble Chart showing the location of the items in relation to the latent Preferred Way of Problem Solving variable and the measurement error estimate, shown by the size of the bubble (Linacre, 2011).

The following Figure 4.4 displays the item map for the PWPS. The right side of the vertical line shows each participant's level of endorsement and the left displays the relative position of the items in the logit scale. Items labelled 02 addressed interpersonal styles, those labelled 03 considered practical situations, and 04 items addressed study conditions.

problem-solving approaches was easily endorsed for both interpersonal and practical situations. In interpersonal, practical, and study situations the items asking “*How easy is it to apply the strategy*” were relatively hard for participants to endorse; these items all sit above the item mean. The items that sit around the mean are “*How often would you use the strategy (interpersonal)*” and “*How often would you use the strategy (practical)*”.

The item “*How useful do you think the strategy is*” was more easily endorsed when asked in relation to practical and interpersonal situation. Participants might have felt able to have more control over problem-solving situations in practical and interpersonal situations than they would have over study situations. This might explain the difference between the response to the study items and the practical and interpersonal items.

The PWPS item map shows that the most difficult item to endorse was PWPS04b “*How useful do you think the strategy is (study)*”. Although the item was difficult for participants to endorse, the bubble chart also shows that the responses to this item were erratic. This suggests that among the participants taking part in the study there were different perceptions of the usefulness of their preferred approach to problem-solving when used for study purposes in an Australian educational setting. Although participants found it difficult to endorse the usefulness of their preferred problem-solving approach to study, the most easily endorsed item was PWPS04a “*How often would you use the strategy (study)*”. Participants’ responses indicated that they had a preferred problem-solving approach that was used regularly in study situations, but they were not readily able to endorse the usefulness of the problem-solving approach in an Australian educational setting.

The item map also shows that the item PWPS02b “*How useful do you think the strategy is (interpersonal)*” and item PWPS03b “*How useful do you think the strategy is (practical)*” were the most easy to endorse items after item PWPS04a. Compared with the study situation, it is likely that the participants felt they had more control over interpersonal and practical situations than they did over study situations. The item PWPS03a “*How often would you use the strategy (practical)*” and item PWPS02a “*How often would you use the strategy (interpersonal)*” were the next items endorsed. These items were then followed by item PWPS04c “*How easy do you think the strategy is to apply (study)*”. Item PWPS04c sits above the item mean, suggesting that more than 50% of participants did not find this item easy to endorse. For the “practical” and “interpersonal” problem-solving items a pattern is shown where the most easily endorsed items are “*How*

useful do you think the strategy is”, followed by *“How often would you use the strategy”*, and then the item, *“ How easy do you think the strategy is to apply”*. Whereas the “study” items show a different pattern of response, where the most easily endorsed item is *“How often would you use the strategy”* followed by *“How easy do you think the strategy is to apply”* and the most difficult to endorse being *“How useful do you think the strategy is”*.

The difference in the pattern for the study dimension suggests that, when considered within a different cultural context, using a process that potentially requires higher order cognitive processing, and is one in which the outcome is not within the person’s control might explain the different pattern of endorsement for the interpersonal and practical problem-solving and the study dimension. The practical and interpersonal dimensions are likely to be within the person's control and could take place with people of their own cultural background with whom they can use a problem-solving approach that all parties involved are familiar with.

It appears that in the study domain, CALD students have less confidence in applying their problem-solving styles in an Australian educational setting. This is an important finding that may help to explain some of their difficulties. This point will be returned to in the discussion.

Results of the Preferred Approach to Study Scale

The Preferred Approach to Study scale was obtained from combining the PLSQ and PWPS items. As indicated earlier, the results for the Preferred Approach to Study Scale will be reported in the same manner to the PLSQ and PWPS. Table 4.8 refers to the infit statistics for the Preferred Approach to Study scale, while Figure 4.6 displays the bubble chart of item infit and the precision of each item. Finally, Figure 4.7 shows the item map for item and person actual item responses as compared with expected Rasch model item responses.

The fit statistics (Table 4.7) show that item PLSQ14 has moved to the underfit zone, suggesting that when the PLSQ and PWPS are combined the unpredictability of the responses to this item moved it out of the ZSTD acceptable zone between ± 2 .

Table 4.7

Item fit order Preferred Approach to Study scale

Item	Infit	
	MNSQ	ZSTD
PLSQ14) I hate disagreeing with others in the group	1.37	2.5
PLSQ01) I like to do class work by myself	1.22	1.4
PLSQ07) It is important to me to be top of the group	1.21	1.6
PWPS4b How useful do you think the strategy is (study)	1.16	1.1
PLSQ04) I like my privacy when studying	1.13	1.0
PLSQ06) Competition between classmates is good for the group	1.11	0.8
PWPS2b) How useful do you think the strategy is (practical)	1.05	0.3
PLSQ16) I should consult with the group before doing a task	1.05	0.3
PLSQ09) I am proud when members of my class get good results	1.02	0.2
PLSQ15) I think I should consider group needs over mine	1.02	0.2
PLSQ03) I enjoy doing tasks differently from other people	1.0	0.0
PLSQ10) Harmony is very important when you are learning	0.99	0.0
PWPS3a) How often would you use the strategy (practical)	0.96	-0.2
PWPS2c) How easy do you think the strategy is to apply (interpersonal)	0.96	-0.2
PLSQ02) When I am successful in my learning it is because of my efforts	0.94	-0.3
PWPS3b) How useful do you the strategy is (practical)	0.93	-0.4
PLSQ12) When doing a group activity I assist others as much as reasonably possible	0.92	-0.4
PWPS3c) How easy do you think the strategy is to apply (practical)	0.92	-0.6
PLSQ05) When people in the group do better than me I need to work harder	0.89	-0.5
PLSQ11) I like to share things with my classmates	0.89	-0.5
PLSQ13) I think the group needs come first	0.87	-0.8
PWPS4c) How easy do you think the strategy is to apply (study)	0.86	-1.0
PWPS2a) How often would you use the strategy (interpersonal)	0.85	-0.8
PWPS4a) How often would you use the strategy (study)	0.85	-1.0
PLSQ08) Competition makes me work harder	0.82	-1.0

Figure 4.5, the bubble chart of the Preferred Approach to Study scale displays the item measure, item fit and precision of the items.

The bubble chart of responses shows that all items fit is within the parameters of the Rasch model, except for item PLSQ14, *I hate disagreeing with others in the group*.

The underfit of this item shows that the item is unpredictable in relation to the expected Rasch model.

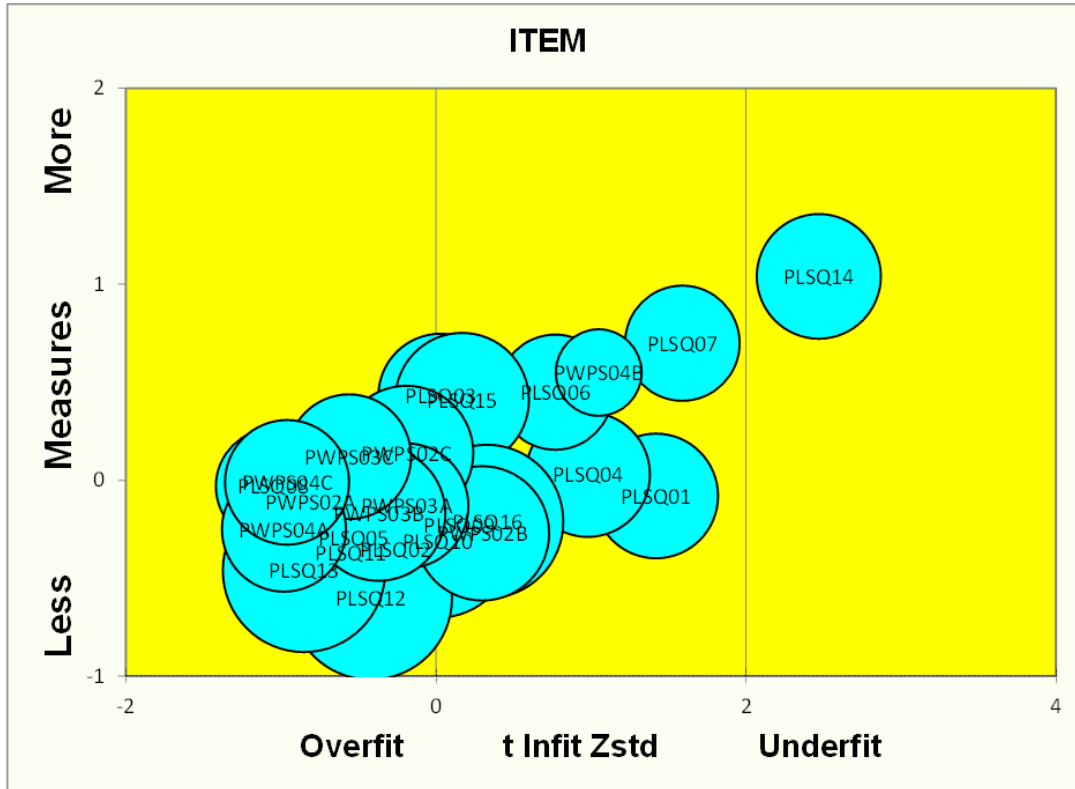


Figure 4.5. Preferred Approach to Study Bubble Chart showing the location of the items in relation to the latent variable and the measurement error estimate, shown by the size of the bubble (Linacre, 2011).

The most difficult item to endorse according to the item fit order table (Table 4.8) was item PLSQ14 “*I hate disagreeing with others in the group*”, it is also the only item to show underfit as shown in Figure 4.5. This item is not working consistently with the other items in the Preferred Approach to Study scale and respondents are endorsing this item in unpredictable ways. It does not appear that the item relates to the preferred study approach of the participants.

Item PWPS04b “*How useful do you think the strategy is (study)*”, which had shown underfit on the PWPS bubble chart now fits within the expected Rasch model parameters for the Preferred Approach to Study scale. In this instance, once the preferred learning style is grouped with the preferred way of problem-solving the usefulness of their study approach is consistent with their preferred study approach.

is preferred by the participants in a study situation. Two individualist item PLSQ02 “*When I am successful in my learning it is because of my efforts*” and PLSQ05 “*When people in the group do better than me I need to work harder*”, sit below the mean and could suggest that participants also perceive their efforts as important in being successful in a study situation.

The Rasch analysis suggests that participants were more able to endorse collectivist items, but also endorsed items about acting individually when working on study tasks. Cukur, De Guzman and Carlo (2004) found that the relational orientation, or how the participants perceive themselves in relation to the cultural or contextual environment, affected the individualist or collectivist position taken by a person. The consequences of being in an Australian educational setting might place CALD students in a position where they wished to work collaboratively with others, but also they are orientated to achieving individual success.

The PWPS item that was most easy to endorse on the Preferred Approach to Study scale was item PWPS02b “*How useful do you think the strategy is to apply (interpersonal)*”, whereas the PWPS item PWPS03b “*How useful do you think the strategy is (practical)*” was not as easily endorsed. The most easily endorsed item on the PWPS was item PWPS04a “*How often would you use the strategy (study)*” and there has been a shift in the position of this item on the Preferred Approach to Study scale. The use of interpersonal strategies could potentially take place within a CALD students’ cultural group, as CALD students are likely to socialise within their own cultural context (Huang & Brown, 2009), which could have a positive influence on the potential for students to endorse the usefulness of interpersonal problem-solving.

The endorsement of Item PWPS04c “*How easy do you think the strategy is to apply (study)*” was about at the item mean as shown in Figure 4.6. This suggests that about 50% of respondents would have found the item easy to endorse. Examining the position of the study items on the Preferred Approach to Study scale item map, items PWPS04b “*How useful do you think the strategy is (study)*” and PWPS04c “*How easy do you think the strategy is to apply (study)*” were the most difficult of the PWPS items for participants to endorse. The pattern of the responses identified in the PWPS has not changed order on the Preferred Approach to Study scale, that being that the interpersonal and practical items retain the same pattern of responses and this pattern differs from the study items, which also remained the same. The item map does show that, when the PLSQ and PWPS were

grouped, there were items that shifted and these shifts suggest that interpersonal items are easily endorsed and how often study strategies are used is not as easily endorsed as it was in the PWPS, while PWPS04b moved from being an underfit item to being endorsed as an item contributing to the approach to study participants use.

Group analyses

To determine the effect of the different backgrounds of CALD students in relation to their thinking styles, a series of tests was conducted to identify differences in thinking by demographic variables. The dependent variables in each analysis were overall ability-person measure, the PLSQ person measure and the PWPS person measure and the Preferred Approach to Study scale person measure. Baylor, Hula, Donovan, Doyle, Kendall, and Yorkston (2011) pointed out that the person measure provides a “direct reference” (p. 245) to the person’s ability. Using either independent samples *t*-tests or ANOVA as appropriate, comparisons were carried out on the basis of whether the students had lived in other countries prior to coming to Australia and age and gender.

Lived in Other Countries

An independent samples *t*-test was conducted for the variable of Lived in Other Countries, where the two categories were “lived in other countries”, and “not lived in other countries” prior to coming to Australia. For the PLSQ, no significant difference was found between the ‘yes’ had lived in other countries ($M=1.10$, $SD=0.619$) and the ‘no’ response ($M=0.835$, $SD=0.644$) condition, where $t(75)=1.598$, $p>.114$. For the PWPS scale, a significant difference in score was found between the ‘yes’ had lived in other countries ($M=1.77$, $SD = 1.3$) conditions and the ‘no’ ($M=1.11$, $SD=1.14$) conditions, where $t(75)=2.131$, $p=.036$. A statistically significant difference was also found on the Preferred Approach to Study scale. There was a significant difference in the scores for ‘yes’ had lived in other countries ($M=1.1$, $SD=0.556$) and the ‘no’ ($M=0.76$, $SD=0.426$) had not lived in other countries conditions, where $t(75)=2.965$, $p<.005$.

These results suggest that having lived in another country before coming to Australia does not contribute to preferred learning style used. These results also suggest that living in another country contributes to the perceived potential of a person of CALD background to problem-solve in an Australian educational setting. Also, when the PWPS is grouped with the PLSQ to form the Preferred Approach to Study scale, having lived in

another country does contribute to perceived potential to problem-solve in an Australian educational setting.

Gender

An independent samples *t*-test was conducted for the independent variable of gender. For the PLSQ scale, there was no significant difference found with the PLSQ person ability measure for males ($M=0.916$, $SD=0.672$) and females ($M=0.886$, $SD=0.671$), where $t(77)=0.323$, $p=.748$. There was no significant difference found for the PWPS between males ($M=1.47$, $SD=1.21$) and females ($M=1.11$, $SD=1.23$), where $t(77)=1.298$, $p=.198$. Finally, there was no significant difference found for the dependant variable Preferred Approach to Study scale measure between the males ($M=0.935$, $SD=0.588$) and females ($M=0.866$, $SD=0.671$), where $t(77)=0.323$, $p=.157$. These results suggest that gender is not significantly related to participants' preferred learning style, or approach to problem solving.

Age Range

A one way ANOVA was used to test the independent variable Age Range for each scale. Participants were asked to identify if they were between the following age ranges – Less than 20 years, 20-30 years, 30-40 years, 40-50 years, 50-60 years, and 60-70 years of age. There was no significant difference reported for the PLSQ person ability measure where $F(4,74)=1.063$, $p=.381$ and no significant difference was found between Age Range and the PWPS where $F(4,74)=0.650$, $p=.624$. For the Preferred Approach to Study scale no significant difference was found where $F(4,74)=1.860$, $p=.126$.

Age range does not seem to be a significant factor in a person's preferred approach to study, or in their perception of themselves as problem-solvers. In this instance, age range does not seem to impact on participants' approach to study.

Summary of the results for Study 1

The results from Study 1 have suggested that CALD students examined in this study generally had a collectivist view of their learning style, but also adopted some aspects of individualist thinking in an Australian study context. Their preferred ways of problem-solving were perceived as useful in both interpersonal and practical settings, but although they applied their preferred approaches in interpersonal, practical, and study situations, in study settings this approach was perceived as less useful. This perception was stronger if they had lived in other countries prior to coming to Australia. Neither gender

nor age impacted on these perceptions. In summary, CALD students in an Australian TAFE setting appeared to have strategies that were effective in everyday situations but less so in classroom context. This finding has implications for teachers of CALD students. The next section addresses teachers' perceptions of CALD students.

Study 2: TAFE Teachers' perceptions of CALD students' problem solving in a mainstream TAFE classroom

Rationale for Study 2

TAFE teachers' perceptions of CALD students as problem-solvers in an Australian mainstream classroom provide a view through another cultural lens linking the perceptions of CALD students with the perceptions of their teachers. Study 2 therefore examines the teachers' perceptions of CALD students as problem-solvers. This study uses both qualitative and quantitative research methods, where examination will be made of responses to specific items from the teachers' questionnaire and analysis will also be made of the written responses made by teachers.

This study examined how mainstream classroom TAFE teachers perceived CALD students as problem-solvers in an Australian, English speaking classroom.

Sample

Mainstream classroom teachers working in the TAFE sector ($N=16$) were recruited to respond to a questionnaire. The participants were teachers teaching in Certificate 3 to Diploma level courses in Child Care at a large metropolitan TAFE. The teachers who responded to the questionnaire all had experience in teaching CALD students. The specific question examined in this study was "How do teachers perceive CALD students' problem-solving skills in an Australian education setting?" The majority of the teacher sample were female, who were within the 30 to 50 year age range. The age range is consistent with TAFE level teachers who are expected to have experience in the area of instruction and could not therefore be recent graduates.

Instrument

The instrument used in this study was based on Wertsch's (2008) approach to Vygotsky's (1978) theory of language as functioning as a cognitive tool. Language development takes place in a social learning context in which a child or adult develops vocabulary along with cognitive and semantic or meaning systems (Hay, Callingham &

Wright, 2013). In this study, Vygotsky's theory of language development was operationalised through the use of Marion Blanks' (2002) Levels of Questioning. An instrument was devised for this particular study, which asked teachers to rate their CALD students on eight items that related to Blank's four Levels of Questioning. The instrument is shown in Table 4.8 with the Blank's levels indicated. The questionnaire used in Study 2 is provided in Appendix B.

Blank's (2002) four levels of questions are briefly reviewed here. A Level 1 question might ask about what is seen and require matching the visual experience to a task, such as in providing a description of a real experience. Level 2 questions ask about classification of objects, or the selective analysis of experience, such as describe a scenario. The type of discourse that might take place at Level 2 with adults could include a discussion on the semantics and context in which a word such as 'counselling' might be used in a class context. Level 3 questions ask about the reorganisation or reordering of experience. At this level, discourse is about the re-telling of the individual's experience of a topic, such as the experience of 'counselling'. At Level 4, questions are related to reasoning about an experience or developing inferences and abstract thinking about a topic. At this level the abstract or inferential thinking about 'counselling' might become part of the discourse (Hay, Callingham & Wright, 2013).

The instrument consisted of eight questions with a Likert scale using five levels – Very Low to Very High. The instrument also offered the chance for participants to make written comments about "Any further issues". The items are shown in Table 4.8.

Table 4.8

Items used in the Teachers' Perceptions of CALD Students questionnaire

Item	Blank's level
1.1 How good are they at providing descriptions of what they have seen	1
1.2 How good are they at naming seen objects	1
1.3 How good are they at identifying differences between items	2
1.4 How good are they at describing a scene	2
1.5 How good are they at adapting information based on classroom experience	3
1.6 How good were they at following a set of directions	3
1.7 How good were they at generalising information to new situations	4
1.8 How good were they at identifying the cause of events	4

Procedure

The Teacher Centre Manager (TCM) of the Child Care Department of a large metropolitan TAFE was approached and asked if the researcher could address a staff meeting about the research. The researcher showed all ethics approval letters and copies of the questionnaire to the TCM and the researcher was given approval to discuss the research project at a teacher staff meeting.

Teaching staff were explained the purpose of the study and were left with a package that contained a plain language statement, a permission form, a questionnaire and an addressed envelope. The teachers were asked to sign the permission form and complete the questionnaire, and mail the completed information to the researcher. There were 16 responses to the questionnaire.

Analysis

The data were analysed using Rasch (Bond & Fox, 2007) analysis. Fit to the model was considered to ensure that the items worked together consistently to measure teachers' perceptions of their CALD students as problem solvers. Comments made by teachers were also analysed using a thematic approach.

Results

The results of Study 2 are reported by first presenting the fit statistics (Table 4.9), followed by Figure 4.8, 'The bubble chart of Teacher Responses', and then Figure 4.7, the item map of the Teachers' Perceptions Questionnaire. Finally the comments made by teachers are examined.

The item fit statistics are shown in Table 4.9. The Item Infit Order table shows that all the items fit within $ZSTD \pm 2$, which suggests that the item fit is within conventionally accepted limits. Items all fell within accepted range of $ZSTD \pm 2$, although items 1.8 "*How good are they at identifying the cause of events*" and item 1.5 "*How good are they at adapting information based on classroom experience*" border on the overfit region, suggesting that these two items were particularly discriminating. It should be noted that Bond and Fox (2007) recommend a larger sample size than the small number of respondents ($N=16$) to the questionnaire. Counting responses alone, however, does not measure the unidimensionality of the underlying construct as noted by a number of writers (Bond & Fox, 2007; Baylor, Hula, Donovan, Doyle, Kendall & Yorkston, 2011). Overall,

all items worked together consistently to provide a valid measure of Teachers' Perceptions of CALD Students.

Table 4.9

Teacher Perceptions of CALD Students item infit order

Item	Infit	
	MNSQ	ZSTD
1.2)How good are they at naming seen objects	1.2	0.6
1.1)How good are they at providing descriptions of what they had seen	1.1	0.5
1.7)How good were they at generalizing information to new situations	1.0	0.3
1.4)How good were they at describing a scene	0.9	0.0
1.6) How good were they at following a set of directions	0.8	0.2
1.3)How good are they at identifying differences between items	0.7	-0.5
1.5)How good are they at adapting information based on classroom experience	0.3	-1.5
1.8)How good were they at identifying the cause of events	0.3	-2.0

Figure 4.7 shows the bubble chart of responses to the Teacher Perceptions of CALD Students questionnaire.

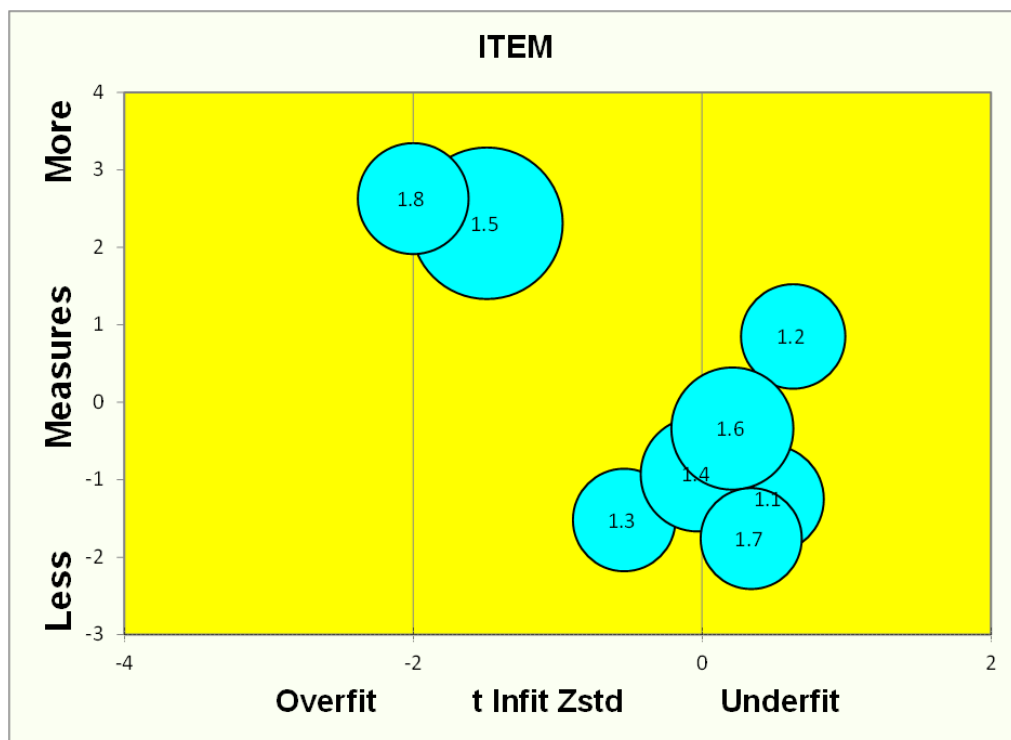


Figure 4.7. The bubble chart of responses to Teacher Perceptions of CALD Students shows the location of the items in relation to the latent variable and the error estimate is shown by the size of the bubble (Linacre, 2011).

Figure 4.7 shows that items fit within the expected range for the model. Item 1.8 (Cause and effect) and 1.5 (Adapting information in the classroom) appeared to be more difficult to endorse than other items. This finding is shown more clearly in Figure 4.8, The item variable map.

Figure 4.8 shows that the most difficult items for teachers to endorse were item 1.8 *“How good were they at identifying the cause of events”*, and, item 1.5 *“How good are they at adapting information, based on classroom experience”*. These items were classified as Level 4 (item 1.8) and Level 3 (item 1.5) on Blank’s (2002) levels. The finding that the Level 3 item (1.5) that expressly addressed classroom settings was difficult for teachers to endorse may indicate that the cultural aspects of an Australian TAFE classroom impact on students. The relatively high difficulty of the lower level items (item 1.2, naming seen objects, and item 1.1, providing descriptions of what they had seen) may indicate difficulties with language and vocabulary.

ability to use practical knowledge in practical settings, such as developing games in a child care environment. The findings suggest, however, that in some situations these CALD students can demonstrate their abilities.

Analysis of teachers' written responses to the questionnaire

Four of the returned questionnaires included written responses. The teachers' comments indicated that CALD students' knowledge of English has implications for classroom activities as well as the potential for students to learn in an English language classroom.

One of the teachers wrote "Where students' written English is not proficient as others I am finding they will work in with English and their home language", and "50% are reluctant to feedback (verbalise) following group activities". The same teacher also commented that classes go at a slower pace to assist students with understanding of topics.

The concerns of another teacher indicated that CALD students struggle with verbal and written communication in English, and these difficulties translated into concerns about CALD students' going to practical placements, which are part of their course structure. The teacher wrote, "Both written and verbal expression of own ideas in English is quite challenging", and "Much 'pretending' to understand in class transfers to poor assessment tasks and some safety issues when on placement".

Another teacher suggested that in some cases the students' knowledge of English is not enough for the teacher to communicate with the students: "In some cases their proficiency in English is so low that two way communication of the sort required for me to be able to answer your questions is simply not possible". The final comment suggested that classrooms of CALD students range in English language proficiency. The same teacher also commented "The range of understanding of English in general varied greatly within the classroom".

Summary of results of Study 1 and Study 2

Both the questionnaire responses and the qualitative written comments made about CALD students by teachers suggest that teachers are concerned about the level of English language that students have. The teachers' concerns were about slowing down of classes, difficulties in communication, CALD students' difficulties in understanding and completing work requirements, and safety concerns while completing placements. Only

one teacher commented how variable English language knowledge was in a CALD class. Although the sample was small, these comments indicate concerns amongst teachers about the potential of CALD students to engage in learning in an English speaking Australian classroom. In addition, the quantitative data suggests teachers' responses to a short questionnaire indicated that they perceived CALD students as having limited capacity to engage with higher-order tasks, although they did indicate that students were able to generalise to new situations. This may have been, however, in terms of simple situations in their child care courses.

CALD students' responses to questionnaires also indicated some challenges for them in study situations in an Australian context. Although broadly collectivist in their views about learning, the students also had individualist perceptions related to their need to work hard and achieve.

Against this background, an intervention was developed that was based on Vygotskian principles, underpinned by Blanks (2002) Levels of Questioning. This study is reported in the next chapter.

Chapter 5: The Intervention Study

This chapter presents the approach and findings from Study 3, the intervention study. The study involved three TAFE teachers using Blank's (2002) Levels of Questioning as an intervention approach in their classrooms to enhance their students' ability to comprehend their instruction. The participant students were predominantly adult students where English, the language of instruction, was not their first language. The research question under review is: Does incorporating Blank's dialogue strategies enhance the learning of adult students where English is not their first language? Data were collected via teacher interview and student survey.

Study 3: Using a dialogue-based intervention

Participants

The study took place in a large metropolitan Technical and Further Education (TAFE) college in Australia. Participants were staff who taught international or migrant students in mainstream educational programs. Three experienced, post Year 12, TAFE teachers took part in the study. Each of these teachers had more than five years teaching experience and were well qualified. One teacher had a PhD, another had completed studies in teaching English as a Second Language and also held a Diploma of Training and Assessment. The third teacher was qualified as a TAFE teacher with a Certificate IV in Training and Assessment. All three staff also had workplace experience in their area of teaching, which was Community Studies. Hence, all teachers had considerable experience and expertise in their own professional domains.

Four TAFE classes were involved in the study and all students were doing a Diploma in Community Services award course. The classes consisted of international CALD students, apart from one Australian student in one of the classes. Most students came from Mainland China, with others from India, Sri Lanka, and Korea. To gain entry to the Diploma level course, all students were required to have an International English Language Testing System (IELTS) score of Level 5.5. Students holding this level of IELTS are described as "moderate users" of English (IELTS Institute, 2011).

In their TAFE classes students were introduced to new concepts that might have had culturally different interpretations. Teaching topics included: dealing with domestic violence; counselling “at risk” individuals; and understanding disability services.

Procedure

The Teacher Centre Managers (TCM) of departments which attracted large numbers of international and migrant students were approached to gain permission for the study. The TCMs were shown a copy of the ethics approval and a copy of the plain language statements to be handed out to teachers. Permission was given to speak at staff meetings at the beginning of the teaching year. The researcher explained the project to teaching staff and left copies of the plain language statement for teachers to examine. Teaching staff were invited to a professional learning session about the project and specifically on Blank’s (2002) questioning approach, after which those who attended the seminar were approached to determine their interest in taking part in the project. Copies of the Information Sheets and Consent Forms for Study 3 are provided in Appendix C.

TAFE teachers interested in the study were provided with a training workshop directly addressing Blank’s (2002) four Levels of Questioning: matching (Level 1); classification (Level 2); reorganisation (Level 3); and abstraction and inference (Level 4) (see Chapter 2, for further details). Discussion at the session included the importance of context in communicating and listening, and several practical activities were undertaken such as how different cultures and people interpreted the word “family”. Depending on context people referred to different aspects of family such as extended families, and ages of children. These kinds of activities focused on using Blank’s second level of questioning, classification, because teachers often move from Level 1 (Matching) to Level 4 (Abstraction) with little scaffolding or support between these levels.

Teachers explored the difficulties experienced by CALD students operating within complex classroom environments and the difficulty of acquiring understanding of context in a room of twenty or more students, especially when the social context of the classroom was unfamiliar. The teachers described their current teaching methods and the difficulties that some students had with the subjects they were teaching.

The teachers were asked to use Blank’s (2002) Levels of Questioning in their classrooms, and to plan for this to happen. Specifically they were asked to use Level 2 (Classification) and Level 3 (Reorganisation) to build towards the aimed for Level 4

(Abstraction) understanding. To do this, the TAFE teachers were asked to make definitions explicit and have discussions about interpretations of the concepts used in the classroom. They were requested to classify words and concepts, such as disability, and to reorganise information, such as service continuum, by providing examples and giving students' opportunities to talk about these ideas.

Examples of using Blank's (2002) Levels of Questioning in the community services context were used at the professional learning workshop, especially aspects of disability which provided some difficulty to the CALD students taking these classes. A particular example used involved cerebral palsy:

Level 1 Characteristics of the topic

- What are the characteristics of someone with cerebral palsy?
- Where do the words "cerebral palsy" come from?
- What may a person with cerebral palsy look like?
- How would a person with cerebral palsy speak and move?

Level 2 Comparison and contrast

- What are differences between having cerebral palsy and not having it?
- What are the problems that you would experience in your home if you had cerebral palsy?

Level 3 Reorganisation, person reflections, applying new knowledge

- Think about being in a wheel chair. How would you get in and out of your house or in and out of your bathroom? How would you do the cooking?
- What changes would you make to your kitchen cupboards?

Level 4 Higher order reasoning

- Why modify the home of someone who has cerebral palsy?
- Why is it important to do a home visit when designing a building modification plan for a person with cerebral palsy?

The aim was to equip teachers with ways to help CALD students to move to higher levels of understanding and reasoning about a particular topic. Operating within the range of questions at their disposal, allowed teachers to modify their questioning according to

students' responses, hence better addressing the student's Zone of Proximal Development (ZPD) (Vygotsky, 1978).

Classroom organisation

During the professional learning session, small group discussion was suggested as one approach to constructing social relationships in the classroom. Teachers were asked to try these ideas in their classrooms and to report back on their success or otherwise. Overall, the intervention lasted nine weeks because this fitted with the operating schedule of the college.

Teacher Interviews

Teachers who participated in the intervention agreed to be interviewed after they had completed the unit of work and assessed the students. Interviews were conducted at the end of the nine week intervention. The interviews lasted approximately one hour with the researcher asking the teachers:

- 1) How they felt the intervention had gone;
- 2) Did they notice any changes in the students?
- 3) What approaches did they use to implement the intervention?
- 4) What difficulties did they identify in implementing the intervention?

The teachers were also contacted via email during the nine week intervention period. This was done to ensure that teachers felt supported and also to provide the chance for them to communicate any concerns they had about the intervention. All teachers were given a pseudonym to maintain confidentiality, Mary, Rita, and Agnes. Responses from emails and interview transcripts were analysed for themes. These were cross-checked in consultation with experienced researchers.

Student Questionnaires

At the end of the nine week intervention period students were given a questionnaire and asked to comment on how they found the classes they had just finished. Students were not given pre-testing so they would not be influenced to change their classroom behaviour

before the intervention occurred. Information Sheets and Consent forms are provided in Appendix C.

Instrument

The Student Questionnaire comprised of two parts. The first section had eight items asking students to reflect on “When I solve problems in class I usually...” Items made reference to lower order problem solving approaches such as; “...leave it until the teacher shows me how to do it” to higher order problem solving approaches such as, “... think carefully about logical steps”. The second section asked “In the class I have taken recently, I...” and was followed by eight items listed that students could respond to. These items asked participants to describe their behaviour and feelings about their class. Questions ranged from “...contributed to classroom discussion” and “...feel more confident when I understand what I am doing”. Each of the items had a Likert scale made up of five possible levels of response (Strongly disagree to Strongly agree). A copy is provided in Appendix D.

Procedure

The Student Questionnaire was a paper and pencil device that took 20 minutes to complete. Permission was granted by the teachers who participated in the study for the researcher to approach students in class, at the end of the intervention period, to ask if they would complete the questionnaire. Agnes had assessment tasks underway and consequently students from her group were not able to be given the questionnaire. The researcher approached the classes after teachers had given permission. The questionnaire was explained to the classes, and students were requested to fill out the questionnaire in their own time. A package containing the Information sheet, Consent form, and the Student Questionnaire was left in the classes for students to take. The package could be completed and dropped by students to the reception area of the Student Services office in a sealed envelope. Arrangements were made by the researcher to be able to pick up the completed questionnaire and consent form at the reception area.

Participants

All respondents were CALD students who were students in the classes in which the intervention took place, with $N=42$ respondents. Each of the classes consisted of students from mainland China, with others from India, Sri Lanka, and Korea. The classes had approximately twenty students per class with a total of four classes being involved in the

study. There were approximately equal numbers of males and females in the classes, with an age range between 20 and 50 years of age.

Results

The results provided in the first section were from the interviews and email correspondence between participating teachers and the researcher. The student questionnaires are reported following the teacher findings.

Findings from teacher interviews and email correspondence

One teacher instructed one of her groups using Blank's (2002) Levels of Questioning for their first topic and applied her regular instructional approach to her other group. She reported that the group she used Blank's Levels of Questioning with were more able to understand the topic requirements than were the group that she used her regular method of instruction with. She also reported that for the other topics she used Blank's Levels of Questioning with both of her groups, and after using this dialogue approach with both groups she reported that there were similar outcomes for both groups.

Teachers reported back after the intervention, especially about their students' success on the TAFE assessment procedures that had been used in the units in the past. The key task was writing a report, which had created many difficulties for past students. Not only did students have to understand the specialist words used, they had to use these in meaningful ways to produce a document of a particular type, similar to what would be expected of them when qualified. Two of the three teachers reported that after using Blank's levels of dialogue as an intervention, the students' understood what was required of them to be able to complete assessment tasks successfully. They also stated that students asked questions of the teachers if they were not clear about what was required of them and observed that students were more motivated in class,

Teachers' perceptions about the language approach

The three teachers approached the use of Blank's (2002) Levels of Questioning in different ways and for the purpose of reporting the interviews that took place with the teachers they have been given pseudonyms; Mary, Rita, and Agnes.

Mary: Mary taught a class on “Domestic Violence”. She was an experienced teacher who had been involved in career development undertaking courses in teaching of English as a Second Language and doing further studies in general teaching.

Mary stated in an email, “It should be noted at this stage that the unit that I am referring to is Domestic Violence. We must consider the depth and perhaps taboos this unit may conjure up”. Mary went on to say “I am currently into the fourth week of the lessons and already I have found that there is a marked difference in the understanding of the assessment requirements and unit outlines from each group”.

She went on to explain in more detail in an interview.

Students who are predominantly students from overseas and with one particular group I used the theory Blank’s and in the other I did not. So I just went through and explained the unit outline and explained what the assessment would be, read through it, this is what we do, got the nod and they said that this was okay... With the second group we dissected every word that was there like “compare” what does that mean and then we put it on the board and worked out what their opinion of “compare” was to what I wanted in the word “compare” and at the very end of that particular task the (group that used Blank) [showed] competency all the way. There was around five I think ...that they did not understand what was being asked in the break-down of the task. So using that theory really when we scaffold and we would build on from that and look into it what their impression of the word is what it means to them”

She described how she used Blank’s approach and of the two groups she was teaching, the group that she used Blank’s approach with were more prepared to ask questions about what was required of them. In an email, she wrote,

Group 1

I had a number of students asking me about the assessment tasks requirements as they would not [have an] understanding [of] questions that they had to answer.

Group 2

From this (using Blank’s approach) the students were able to rephrase this question so that they had an understanding.

She further commented,

So even though educated people and some [can] throw a word at us, our perception can be different. I think that the biggest thing that you find with international students, not that we've presumed, but you take on the knowledge that you and I have probably been brought up with. The same value system and the same educational system primary, secondary, TAFE tertiary, we cannot do that (with people of CALD background) because we've now got people coming in that have had that different educational system.

Mary stated " ... even the feedback in class the group that had Blank's were thinking and were coming through and asking their own questions but the first group was asking to go explain that again." Mary felt that her students were able to move to Level 3 question processing quite quickly.

Commenting on student motivation Mary stated;

I think that to keep students engaged and to keep students in the course they must feel that they're getting something out of it. I found that the people I did Blanks with had a better glossary (talking about an assessment task) and were more prepared to ask and they knew my teaching style was to dissect different things so they felt very comfortable to come to me to say what does that mean.

The second teacher, Rita was involved in teaching a class in Counselling. Rita was an experienced teacher who had also worked in the welfare system for a considerable period. She was also a convener of a number of professional bodies associated with welfare.

Rita used the intervention with a class that was made up of 22 students of Korean, Chinese, Sri Lankan, and Indian background. One member of the group was a local student. Rita had known the group for 2 years. She not only took the group for classes, but was also the pastoral teacher for the group. The group was well known to her.

Rita used small group discussion to introduce the class to Blank's Levels of Questioning. Classes were broken down into peer groups and the target word, or concept was discussed in the group. The groups were then brought back into a whole class group and the word or concepts were open for group discussion.

Rita commented,

The group became accountable for what was meant ...when you ask somebody a question and you are asking them to say what they believe or think or know and asking them to expose that known or unknown, it is daunting for them. To give it to them in groups, and that had all been checked out and everything and discussed, the daintiness was gone, because they had already spoken about it, so as I said there was also some ... even in groups, it doesn't mean they come up with one answer, what they might come up with is some of us in the group thought this and others thought that it was okay for the group to agree to disagree.

Rita also noted that there were changes in individual students. She went on to describe the change that occurred in a female Korean students. Rita said

Let me tell you this though, this is the amazing thing, this is like, oh my goodness, there is this one girl in the class who hardly ever spoke, she wants to stay in Australia, but she didn't practice her English at all, so you go through classes when she didn't speak, and if she asked a question, she would look at somebody and somebody would answer for her and she would relay what they had said. (referring to the introduction of Blank's levels of dialogue) this girl is going to fail, to the top of the class, she went from being the bottom of the class and me thinking, this girl is going to fail, to the top of the class, and she was able to stand up and speak... she didn't hesitate to speak up in front of me...and I couldn't believe it. This girl who would go for weeks without speaking and she could actually...it was amazing, it was just amazing that she actually had this knowledge, but she was just terrified of speaking it in case she was wrong. That was just amazing, that just blew me away.

Rita suggested that the dialogue process increased the confidence of the group to speak up about a topic. The topics discussed included defining the term "counselling". The small group discussion and later conversation in whole class led to the teacher comment "It would go a lot deeper". On students' capacity to start to develop Level 3 processing Rita commented, "Yes, and the exploration of not only what is the definition of the word, but the experience of the word, and the cultural experience of the word, and even awareness to see it in a different light."

When asked about motivation Rita stated,

So the thing about Blank's, it really encourages them to participate and in fact we had a whole discussion on class participation as well, around it, and how do you want to participate in class, and without them even knowing about Blank's stuff, they wanted to do it that way."

Agnes: Agnes was an experienced teacher who holds a PhD related to hearing deficits. Agnes taught a class in "impairment, disability, handicap words we do use and words we don't use". One approach taken by this teacher to introduce a concept was described:

Look at case scenario for the assessment about a woman with multiple sclerosis. Question: What is multiple sclerosis? It's a disease, can't move, get worse. Explain it's a disease of the nerves, two types of nerves, sensory and motor explain these differences. Sheath around the nerve is wearing away – sclerosis. Auto immune disease-own body is doing damage-don't know why. Progress of disease can be different for different people-rapid, slow, stop and start.

Agnes described writing words on the board and then discussing them with the class. She said that her experience working with deaf people had assisted her in communicating with people of different backgrounds and commented that she found Blank's approach hard to implement in a classroom situation. She indicated that she did not feel confident with each level of questioning and also indicated that where a word or concept was perceived to not be understood small group was part of her normal classroom practice.

Summary of findings from the teachers

Two points emerged from teachers' comments about the use of Blank's approach in their classrooms.

- 1) When working in small groups students developed an understanding of words or concepts they were not clear about before. Students showed that they were able to contextualise words and concepts relevant to the subject area and use that knowledge to assist them in understanding the course content.
- 2) Students also developed greater confidence in being able to ask questions, which two of the teachers suggested was not common place in their experience before the intervention.

For example, Mary described differences in the way the two classes engaged with her. The intervention group involved more students asking questions and students being better able to grasp the requirements for the assessment tasks. Rita described the Korean female student who was at risk of failing the course. After the intervention was used in the classroom this student was able to grasp ideas and move ahead of other students to become one of the best students in the class.

The results show the intervention assisted the students in developing the potential to ask questions. Both teachers observed that this would not have been the case in their past experiences. The teachers also described classes as becoming more interactive with students engaged in classroom activities.

Agnes was the only teacher who did not fully adopt Blank's approach. She described using Level 3 (reorganisation) questions and moving to Level 2 (classification) questions when the need to do so became obvious. Agnes felt that Blank's Levels of Questioning was not easy to grasp, saying "the actual process was fairly confusing I think, I didn't have a clear idea in my mind as to what the four different stages were." It appeared that she did not have a view of language as an organizer of thought. Instead, her perception was that language was structured and functional, with few cultural overtones. She seemed to expect that because her students spoke functional English they would automatically understand the pragmatics of Australian classrooms. It is possible that Agnes' previous experience with students who were deaf learning functional English had influenced her notions of language. Her difficulties, however, are a useful reminder that very experienced and successful teachers may take time to absorb new techniques into their practice.

The teachers' observations about the classroom intervention were addressed using interviews and emails. At the end of the subject period students from class groups were surveyed to determine their experience of the intervention in the classroom. These results are discussed in the next section.

Student Questionnaire

Feedback from the CALD students, collected through surveys handed out to students at the end of their unit of study were positive. The students indicated that their teachers were able to explain the content requirements of the subject and were responsive to the

students' questions. Overall the students felt more confident about responding to the course content.

Results

The student questionnaires were analysed using the same approach as that taken in Study 1, the PLSQ and PWPS. The validity of the questionnaire was identified by considering fit to the Rasch model. Item difficulties were determined using Rasch analysis and the associated variable maps provided a means of considering which aspects of their class experience students' found difficult.

Table 5.1 shows the mean and Standard Deviation of the Likert scale responses to items from the Student Questionnaire. The mean and SD of Item 2.8 (I feel more confident when I understand what I am doing) suggests that the distribution exhibits skewness, while the deviation from the mean of Item 1.1 (When I solve a problem in class I usually remember how I solved a similar problem in the past) suggests kurtosis. Responses to Item 2.8 indicated that the students felt confident about their class and those to Item 1.1 suggested that there was little variation among the students' responses.

Table 5.1

Mean and standard deviation of student responses

Item		Mean	SD
1.1	When I solve a problem in class I usually remember how I solved a similar problem in the past	3.60	.088
1.2	When I solve a problem in class I usually just have a go at the first thing that comes to my mind	3.05	0.88
1.3	When I solve a problem in the class I usually think carefully about the logical steps	3.90	0.93
1.4	When I solve a problem in class I usually break the problem down into small steps	3.60	1.06
1.5	When I solve a problem in class I usually talk to my teacher about how to solve the problem	3.70	1.10
1.6	When I solve a problem in the class I usually talk to other students about how to solve the problem	4.00	0.88
1.7	When I solve a problem in the class I usually look for a similar problem in a book and copy it	2.50	1.20
1.8	When I solve a problem in the class I usually leave it until the teacher shows me how to do it	2.30	1.10
2.1	I found it easy to understand what the teacher wanted me to do	3.90	0.74
2.2	I usually understood what was expected of me	3.90	0.78
2.3	I found it easy to understand the ideas that were taught	3.80	0.85
2.4	I enjoyed my learning experience in this class	4.20	0.63
2.5	I liked the way that the teacher asked questions	3.80	0.85
2.6	I contributed to class discussion	4.02	0.81
2.7	I asked questions to the teacher about the material	3.90	0.79
2.8	I feel more confident when I understand what I am doing	4.60	0.59

Table 5.2 shows the item fit to the Rasch model. Fit scores are expected to be within the conventionally accepted estimate between ± 2 for the ZSTD statistic which has a mean of 0 (Bond & Fox, 2007). Table 5.2 shows that all the items fit within ± 2 which suggests that the items are working together in consistent ways to measure a single unidimensional construct, identified as Students' Perceptions of the Learning Experience.

Table 5.2

Student questionnaire item infit

Item		MNSQ	ZSTD
1.1	When I solve a problem in class I usually remembered how I solved a similar problem in the past	1.60	1.8
1.7	When I solve a problem in the class I usually look for a similar problem in a book and copy it	1.30	1.7
1.8	When I solve a problem in the class I usually leave it until the teacher shows me how to do it	1.30	1.5
1.2	When I solved a problem in the class I usually just have a go at the first thing that comes to my mind	1.20	0.9
1.6	When I solve a problem in the class I usually talk to other students about how to solve the problem	1.06	0.4
1.4	When I solve a problem in class I usually break the problem down into small steps	1.02	0.2
1.3	When I solve a problem in the class I usually think carefully about the logical steps	1.00	0.1
1.5	When I solve problems in the class I usually talk to my teacher about how to solve the problem	0.92	-0.3
2.8	In the class I have taken recently I feel more confident when I understand what I am doing	0.91	-0.4
2.4	In the class I have taken recently I enjoyed my learning experience in this class	0.87	-0.6
2.3	In the class I have taken recently I found it easy to understand the ideas that were taught	0.85	-0.7
2.7	In the class I have taken recently I asked questions to the teacher about the material	0.82	-0.8
2.6	In the class I have taken recently I contributed to class discussion	0.81	-0.8
2.1	In the class I have taken recently I found it easy to understand what the teacher wanted me to do	0.81	-0.8
2.2	In the class I have taken recently I usually understood what was expected of me	0.81	-0.8
2.5	In the class I have taken recently I liked the way that the teacher asked questions	0.77	-1.2

The bubble chart of the Students' Perceptions of the Learning Experience Questionnaire displays the item measure, item fit and precision of the item. The bubble chart is shown in Figure 5.1. The bubble chart shows the location of the items in relation to the latent variable and the error estimate is shown by the size of the bubble (Linacre, 2011).

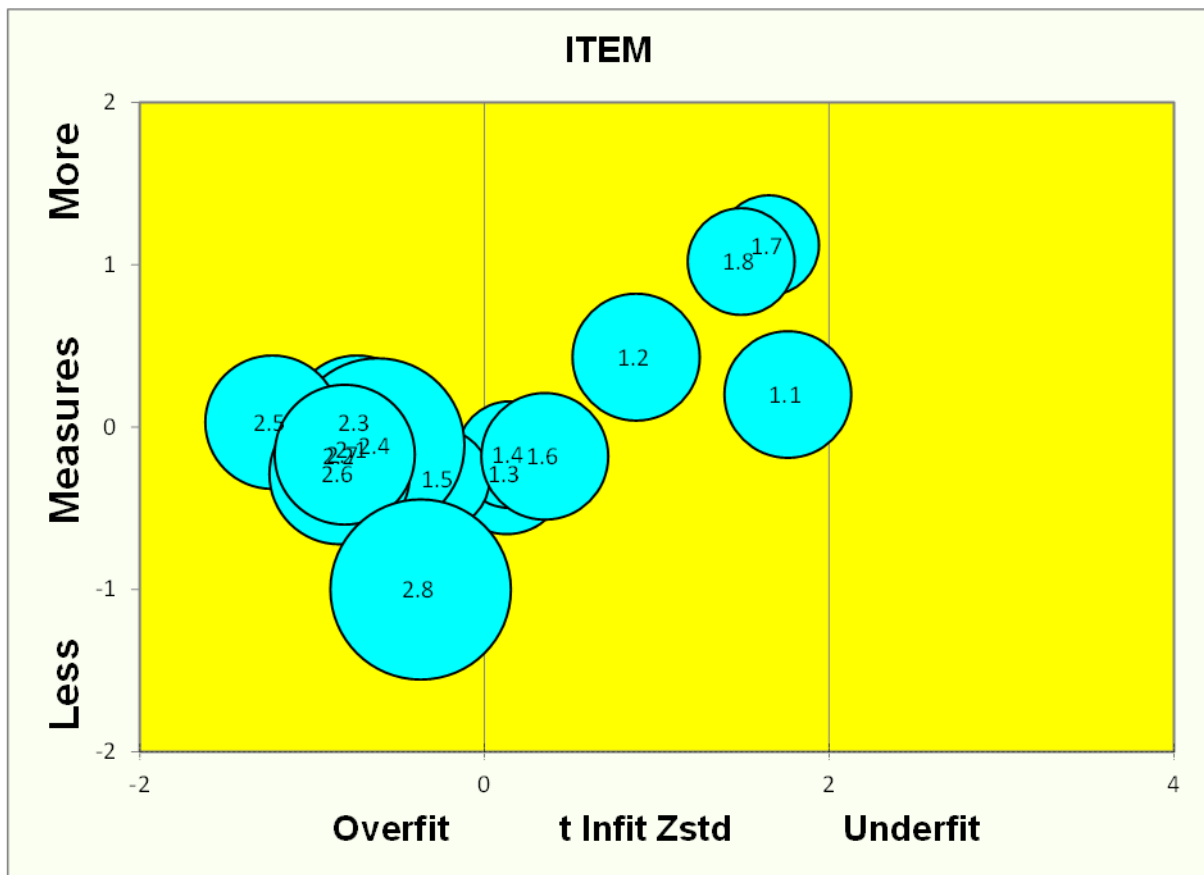


Figure 5.1. Bubble chart of responses to the Students' Perceptions of the Learning Experience Questionnaire.

Item 2.8, *I feel more confident when I understand what I am doing*, was the most easy to endorse item. Item 1.1, *When I solve a problem in class I usually remember how I solved a similar problem in the past*, and item 1.8, *When I solve a problem in the class I usually leave it until the teacher shows me how to do it*, and item 1.7, *When I solve a problem in the class I usually look for a similar problem in a book and copy it*, tended towards underfit, or randomness.

Figure 5.2 displays the item map for the Student Questionnaire. The right side of the vertical line shows each participant's level of endorsement and the left displays the relative position of the items on the logit scale.

Summary of results

The reporting from teachers and students indicated that the intervention increased CALD students' willingness to participate in classroom questions and also to ask questions of the teacher. The teachers and students indicated that there was also an increase in the understanding of the work that they were required to complete. Huang and Brown, (2009) noted that CALD students are often reported as quiet and that they do not contribute to classroom discussions, or answer teachers' questions. Overall, the responses to items from the Student Perceptions of the Learning Experience Questionnaire suggest a different pattern of classroom interaction to that often reported by teachers about CALD students' participation in western style classrooms and the questionnaire results support the teachers' observation.

The next chapter considers the results from all three studies in relation to the associated literature.

Chapter 6: Discussion

The discussion is presented in four sections. First, a summary of the overall study results will be reported. The outcome of the first study will then be discussed, and the research question “How do CALD students perceive their problem-solving skills in an Australian educational setting” will be reviewed. Then, the second research question “How do teachers perceive CALD students problem-solving in an Australian educational setting” will be considered. This will be followed by a discussion of research question 3, “Does incorporating dialogue strategies enhance the learning of adult students where English is not their first language”. In conclusion, the implications of the study as a whole will be reviewed and suggestions made for further work.

Summary of the results of the studies

This study comprised three related research projects addressing different aspects of CALD students’ experiences in an Australian TAFE setting. The results of the Rasch Analysis in Study 1 indicated that CALD students perceived that they had sound problem-solving skills, but that in an Australian educational setting they were of less use. The students appeared to continue to find their problem-solving approaches effective and useful in interpersonal and practical situations.

This finding was borne out by Study 2, which found that Australian TAFE teachers perceived that their CALD students had difficulties in Australian classrooms, which they attributed to their language skills. The second question asked about teachers’ perception of CALD students as problem-solvers “How do teachers perceive CALD students problem-solving in an Australian educational setting” and in this context teachers have suggested that CALD students had a general difficulty in being able to attend to abstract level cognitive tasks.

The third study, Study 3 addressed the question “Does incorporating dialogue strategies enhance the learning of adult students where English is not their first language”. The study examined whether a dialogue strategy would enhance the learning of adult CALD students in a TAFE setting. The finding from teacher interviews and student responses to a questionnaire supported the introduction of Blank et al.(1978) Levels of

Questioning into mainstream TAFE classrooms as a way of supporting the learning of CALD students. Study 3 showed that a language-based intervention was effective in alleviating some of the difficulties experienced by CALD students.

Research Question 1: How do CALD students perceive their problem-solving skills in an Australian education setting?

Study 1 showed that participants tended to prefer a collectivist approach to learning, but participants also included elements of individualism within their approach to learning. These results suggest that the preferred learning style was collectivist, but the results are not conclusive. Oyserman and Lee (2008) noted that individualism and collectivism have been one way in which the study of cultural differences has been operationalized. The current study used individualism and collectivism, with four dimensions, Horizontal Collectivism, Vertical Collectivism, Horizontal Individualism, and Vertical Individualism. The added dimensions provided wider scope to investigate individual differences in preferred approaches to learning. The collectivist position identified from participants' responses indicated that there was some evidence of a leaning toward horizontal collectivism over vertical collectivism. The horizontal collectivists see themselves as a group member and the well-being of the group is important to them, but they are also able to detach themselves from the group and are not subordinate to the group (Hornik & Tupchiy, 2006). This finding is consistent with the inclusion of some individualist items among those which participants found easy to endorse. CALD students' responses to the PLSQ also indicated that although they preferred a collectivist approach to learning style, they were influenced by individualist ideas related to them having to work hard to be successful in their studies. Oyserman and Lee (2008) pointed out that there is not a conclusive body of evidence which shows that the individualist and collectivist paradigm explains cross-cultural differences between countries. They used a priming approach to examine individualism and collectivism, through activating mental representations that were used in interpreting information being processed. Although Hornik and Tupchiy (2006) were clear in their conviction that culture has some level of influence on learning, they used the four dimensions of collectivism and individualism used in this study because they believed it would also provide insight into individual differences. The current study has provided some support for the results of the Hornik and Tupchiy study, in that the evidence suggests a leaning to horizontal collectivist values among the participants, but the results are not conclusive.

In relation to the first research question “How do CALD students perceive their problem-solving skills in an Australian educational setting” the study identified that when asked about problem-solving in an Australian TAFE educational setting, using the PWPS questionnaire, participants’ responses to practical and interpersonal problem-solving produced a consistent pattern of responses. When asked about study situations, however, the response pattern differed from the other two conditions. The findings suggested that despite a perception of having sound problem-solving skills, these were less useful in an Australian education setting, particularly in study situations. These results are similar to Bell’s (2007) findings in that she found that post-graduate students of CALD background studying in Australia took time to comprehend and adjust their study approaches in an Australian higher education setting. The students Bell reported on were post-graduates and were experienced in their particular area of study, but they had to make adjustments to a different learning environment. Bifuh-Ambe (2009) also showed that when a CALD student develops metacognitive awareness of a new educational setting this contributed to a student’s potential to be successful in their studies. Bell and Bifuh-Ambe focused on students studying in a higher education environment, whereas, the current study was focused on how vocational level students perceived themselves as problem-solvers.

The Rasch analysis of the PWSP provided a hierarchy of endorsement from easiest to hardest items related to responding to each of the aspects of problem-solving. In both the “practical” and “interpersonal” conditions participants had a similar order of endorsement with “usefulness of the approach” the easiest to endorse and “ease of use” the hardest. Despite interpersonal problems potentially being harder to problem-solve than practical problems, the inter-personal situation could potentially involve people from a similar cultural background with whom CALD students might tend to socialise (Barron & Dasli, 2010; Huang & Brown, 2009). In this situation they would be able to make better contextual predictions about outcomes, and might perceive themselves to have some control over the process. When problem-solving in “study” situations in culturally different circumstances, their responses indicated that the utility and ease of use of their preferred problem-solving approach were difficult to endorse, whereas they were able to endorse that the study approach was used often. Clark and Flores (2007) and others (Singh, Märtsin & Glasswell, 2013; Hatano & Wertsch, 2001; Vygotsky, 1978) have argued that there are different levels at which a person can interact with a given culture and that these

interactions vary in cognitive complexity. There is also some evidence that there are cross-cultural differences in approaches to problem-solving (Güss & Wiley, 2007).

The issue identified from the current study is that CALD students appeared to have consistent approaches to problem-solving in practical and interpersonal situations, but were not able to endorse the utility of their problem-solving approach under study conditions. Leverag and Aukrust (2010) pointed out students whose second language is English are likely to have poor instructional comprehension skills and therefore require extra pedagogical attention. Murray (2010) and others (e.g., Harper, Prentice & Wilson 2011; Ramburuth & Tani, 2009) have also argued that functional English is not enough for CALD students and they need to be supported with understanding the academic language used in their area of study in order to comprehend what is required of them. These two language-based aspects may contribute to the CALD students' perceptions of their problem-solving approaches in Australian TAFE settings.

There is a body of evidence that shows CALD second language learners can potentially find that verbal working memory operates more slowly, or can be overloaded, when processing a second language (Pae & Sevcik, 2011; Swanson et al., 2006). De Guerrero (2005) showed the inner-speech of an adult second language learner occurs at two levels where an utterance is translated from the home language into the second language placing a heavy burden on the verbal working memory capacity of an individual to decode meaning from utterances that occur in a classroom. Although the current study did not directly investigate verbal working memory it seems that the burden of decoding complex higher order tasks may offer some explanation as to why CALD students are not able to identify the usefulness of their problem-solving approaches in an Australian educational environment.

Findings from the work of Koriat, Bjork, Sheffer and Bar (2004) related to the use of heuristics in metacognitive monitoring, and particularly the use of theory-based judgements about learning that incorporate beliefs about individual abilities and self-efficacy, are also relevant. The difficulty participants had in endorsing previously used approaches to problem-solving in study situations could mean that the theory-based heuristics are not seen as useful in a different educational environment where the experience-based judgements require different responses because the teaching and learning environment differs from what the CALD student is used to. When the heuristics are

perceived as not being useful then it is likely that the ability to make choices about responding to a study situation becomes inhibited until the student has the chance to comprehend what is required of them in the new study environment.

When respondents had reported experience of living in another country before coming to Australia, there was a statistically significant difference in their perceived use of their preferred approach to problem-solving compared with those who had come directly to Australia without the experience of living in another culture. Hence, having experience of another culture supported the perceived potential of CALD students to problem-solve in an Australian TAFE educational setting. These findings are supported by the work of Downing, Wong and Shin (2006) who found evidence that living in another culture supported the development of different problem-solving strategies. They suggested that “Everyday challenges emerging from the new social context provide fertile environments for the development of metacognition” (p.9). The student population reported on by Downing et al. were Chinese mainland students coming to Hong Kong to study at university and even though there may have been similarities in the educational cultures, there are also likely to have been language and cultural factors with which the mainland Chinese students were unfamiliar. As Tadmor and Tetlock (2006) pointed out, there are differences in the level of adjustment that migrants to a new culture have to make that are dependent on how distant the new culture and language system is from their home culture and language. Experience of living in another country seemed to support CALD students who were in TAFE education to make adjustments to the Australian culture at the interpersonal and practical problem-solving levels, but the respondents were not as likely to be experienced in an Australian educational environment. Tadmor and Tetlock also suggested that when a person becomes bicultural, that person can apply flexible cognitive processing approaches to problem-solving because cognitive models from both the new and old culture can be incorporated. Most of the students in this study had not been in Australia for enough time to have absorbed the new culture and could not be considered bicultural.

The issue of the cognitive load placed on a person to comprehend the differences in an educational environment with which they are not familiar, as well as the comprehension of words and concepts used in a TAFE classroom, are likely to contribute to the difficulties faced by CALD students. As Singh, Märtsin and Glasswell (2013) identified, there are two

levels at which cultural knowledge develops: (1) everyday knowledge where interactions occur at the practical problem-solving level within a given community, and (2), scientific and abstract knowledge, which was learned by engaging in educational instruction. It would seem that while respondents felt the experience of living in another country, before coming to Australia, contributed to students' problem-solving at the everyday level of knowledge development, as shown in their responses to problem-solving at the practical and interpersonal levels, they are less likely to have experienced problem-solving at the study level in Australia and therefore were not experienced in how to apply scientific and abstract knowledge in Australian educational context.

Hatano and Wertsch (2001) argued that cognitive processing is not only an internalised self-directed process, but is one that is influenced by cultural and contextual conditions. The outcomes from Study 1 provide a pattern of responses to the items that fits with Hatano and Wertsch's contention about cognitive processes. Hatano and Wertsch based their theoretical position on the work of Vygotsky (1978) and the prominence Vygotsky gave to language as a tool to be used to problem-solve. The students who responded to the questionnaire about problem-solving were of CALD background and had been, or were being taught English that mostly focused on the functional use of language. Though the importance of grammar and vocabulary is not in question, when language learning is considered from Vygotsky's perspective the connection between language and cognitive processing becomes evident (Wertsch, 2008). Particularly evident is the idea that language is a tool that assists individuals with access to different levels of cognitive processing. In support of this claim Williams, Bowler and Jarrold (2012) noted that there is a body of recent neuropsychological evidence that links linguistic thinking to executive functioning, that is, the potential to organise and plan thinking. The students in this study had relatively limited English language skills being classed as "moderate" users, which could indicate potential difficulties in developing higher order cognitive processing.

Theories that examine second language learners' development, particularly in adults, such as the Fundamental Differences Hypothesis (FDH) have contributed to the debate about second language learning at the level of grammar and vocabulary development. Vygotsky's (1978) socio-cultural theory focuses on describing language learning within a hierarchy of cognitive processing to which language contributes. The FDH would attribute difficulties with acquiring study level skill directly to second-

language learner issues related to grammar and vocabulary, and the related potential for adult second language learners to use only shallow cognitive processing (Bley-Vroman, 2009). CALD adults, such as the participants in the current study, according to the FDH, are likely to comprehend information at a shallow level when compared with native speakers; the information understood is not as detailed as it would be for a native speaker.

Bley-Vroman (2009) used Ullman's (2001) cognitive model of L2 adult cognitive processing to explain why adult second language learners are likely to use shallow cognitive processing. The suggestion is that procedural knowledge of a problem-solving situation is intrinsic, and as a consequence adult second language learners need to use more declarative extrinsic knowledge to solve language-based problems than do native (L1) language speakers. In other words, in a particular situation, such as a classroom, the teacher may assume intrinsic knowledge of an issue which is not actually available to L2 learners. This is due to the L2 adult not having the experience of the language that the L1 native speaker does. In this context the more complex the problem, the more difficult Ullman suggests it is for the adult second language learner (L2) to solve the problem using L2 knowledge because L2 adults can only use shallow linguistic knowledge to problem-solve in a second language. These issues, however, are more related to functional language knowledge and do not directly address concerns about academic language and the connections between language and cognition as expressed by Vygotsky (1978). Herschensohn (2009) has noted that Ullman "does not explain how initial L2 declarative knowledge eventually becomes paralleled by L2 procedural abilities" (p. 272). In this context Herschensohn points to evidence that shows that procedural knowledge can become available to the L2 learner, if the L2 is learned early enough, or is practiced enough. Bräten (1991) argued that effective self-regulation of speaking and comprehension does not fully occur until inner-speech and thinking operate as one system. The significance of inner-speech as a mediation process is in explaining the bridge between other regulation and self-regulated activity. Mediated activity allows metacognitive processing to develop and is influenced by cultural tools such as language (Bräten, 1991). This position differs from that expressed by the FDH, in that the language is considered to be a tool used to mediate thinking. In the context of the current study the FDH does not provide an explanation for why participants were able to perceive they were able to problem-solve at the interpersonal and practical levels, but could not endorse the effectiveness of their problem-solving at the study level. Participants were likely to be able

to mediate thinking at the interpersonal and practical levels of problem-solving, but were not as readily able to do so at the study level (Hatano & Wertsch, 2001). This discussion also indicates that a language-based intervention could be helpful to CALD students, as addressed in Study 3.

The evidence from this first study shows that participants could not readily endorse the use of previously used problem-solving approaches in Australian study situations. It can be speculated that the difficulty in endorsing previously used approaches to problem-solving were due to differences in the cultural/contextual and language based understanding the CALD students had of the Australian educational system. In the context of organising and planning higher order responses to problem-solving, Davidson and Freebody (1988) defined metacognitive level processing as “awareness of what is required by the context of the person within the context” (p.29). This definition of metacognition suggests that one aspect that is critical to problem-solving is contextual understanding and the potential to feel some control over the use of a problem-solving approach. Taken from the perspective defined by Davidson and Freebody, the results of Study 1 suggest that a person has to have contextual understanding of the problem area in order to apply appropriate metacognitive awareness and strategies to the task to be comprehended. The Preferred Approach to Study scale links the problem-solving approach from the PWPS with the collectivist orientated learning style, from the PLSQ, of the CALD students. This collectivist style differs from what Sanagavarapu (2008) has described as the individualist approach to Australian culture.

Study based problem-solving is likely to be abstract in nature, particularly as higher level education is engaged in, and there is a need to understand what is required before making the leap to abstract inference and prediction. Bell (2007) provided an example of this level of difficulty for Indian and Bangladeshi post-graduate students studying in Australia, stating that, “they reported, they realised that they had to read for different purposes, not for examinations, but for developing a more holistic view of their research” (p.95). These were students who had an existing level of knowledge of their study area but struggled with a different educational context, until they were able to put in perspective the contextual modifications required about what was expected in the Australian context compared with their home country’s educational context. TAFE students from different cultural backgrounds are less likely to be familiar with the language of a technical area

they might be studying, while also being unfamiliar with the Australian educational context. The findings from Study 1 are consistent with Bell's research suggestion, and in line with the findings of Hall et al. (2005), albeit in a different context.

Vygotsky's (1978) socio-cultural theory would suggest that there are levels of cognitive processing and the different levels of comprehension are influenced by the learner's background, cultural factors, experience, and individual differences in perceptions of these conditions (Hatano & Wertsch, 2001). The CALD students in a TAFE setting, therefore, might understand words and the grammar structure of the language, and they might be able to take in the technical details of an utterance, but not comprehend subtle aspects of the communication that are critical to making inferences about the topic. In the case of an educational setting, the potential to put in place the contextual nature of an expression might require higher order processing which may not be easily managed at the functional or technical level of language understanding.

The data reported in Study 1 also reflect Vygotsky's (1978) understanding of developmental changes that occur at the older adolescent to young adult period of development, which is the approximate age range of most CALD students in TAFE settings. Vygotsky named these changes as "the processes of revolution" (Gredler, 2009, p, 7), and during this period people are more able to bring their experiences and formal learning together. In developing this potential, Vygotsky suggested that individuals are able to think outside of their experiences and develop abstract ideas and concepts, but this leap occurs through the individual's participation in cultural and educational experiences. The findings in the current study that CALD students felt competent at problem-solving at practical and interpersonal levels, but were less able to use their existing problem-solving skills in a study situation, may be explained by the potentially abstract nature of study. It could be speculated that the participants were not readily able to make the "revolutionary" leap in cognitive processing in the new cultural/contextual setting because they were less well equipped with appropriate cultural and cognitive tools of the language. As previously noted, Singh, Märtsin and Glasswell (2013) suggested that Vygotsky distinguished between two levels of knowledge. One level was everyday knowledge and involved interactions at the practical problem-solving level within a given community, while the second type of knowledge was scientific and abstract, and was learned by engaging in educational instruction. Learning the vocabulary and grammar of a new culture supports

the development of everyday knowledge and, hence, problem-solving at that level, but it does not necessarily support the development of abstract knowledge in a new educational context. Where higher order cognitive processing is needed to comprehend the TAFE teacher's instruction and information, the students' functional language knowledge may not be enough because it only supports knowledge development at the everyday knowledge level.

Research Question 2: How do TAFE teachers perceive CALD students' problem-solving skills in an Australian educational setting?

Whereas Study 1 focussed on CALD students' perceptions of their approach to learning in an Australian TAFE context, the second study addressed their teachers' perceptions. In response to a questionnaire, Australian TAFE teachers suggested that CALD students are not readily able to apply abstract thinking in their classrooms. Although they easily endorsed the idea that CALD students could generalise their thinking, usually a higher-order thinking skill, they also found it difficult to endorse their students' ability to identify cause and effect. It appeared that the generalisation was probably in the context of practical situations in a childcare setting. Not only is this consistent with students' self-perceptions of their problem solving skills, it also reinforces previous suggestions that language takes two forms: functional everyday language and the more abstract ideas that are often met in education (Singh, Märtsin and Glasswell, 2013). Childcare as a subject draws on ideas such as play, with which CALD students would be familiar in their own cultural setting, and which uses everyday situations such as "playing shop" or "playing house". More abstract concepts met in a childcare course are those such as quality assurance frameworks, and the consequences of not meeting these. It seems a reasonable supposition that CALD students would find these abstractions more difficult to deal with, because they would be less likely to have encountered these in their home culture.

The teachers' attributed their CALD students' difficulties to their lack of language. In addition they reported a lack of engagement such as not giving feedback after a group discussion. It has been noted that CALD students often come from different learning environments (Huang & Brown, 2007) to those teaching practices that take place in Australia. It is possible that to some extent the broadly collectivist approaches to learning indicated by CALD students differs from that of Australian teachers, where the educational

system is focused on individual achievement. The findings of Study 2 have shown that TAFE teachers perceived the TAFE CALD students as potentially having difficulties coping with cognitive tasks that required them to use higher order processing.

When the teachers' perceptions of CALD students are viewed through a socio-cultural lens, the difficulties experienced by CALD students in interpreting the teacher's instructions are placed in a different context. The difference between functional language knowledge and academic language knowledge or, as Singh et al. (2013) have described it, the difference between everyday knowledge and scientific/abstract knowledge produce a different way of explaining CALD students' difficulties in interpreting the teachers' instructions. When the CALD student is not able to access the abstract instructional language of the teacher the CALD student is then attempting to organise knowledge using language systems that are linguistically and cognitively not within the reach of the abstract conceptual level of language use the teacher is working at. Several researchers (e.g., Gredler, 2011; Singh et al., 2013; Vygotsky, 1978; Wertsch, 2008) have noted that abstract level thinking is a product of the educational knowledge produced within a cultural context. Taken from this perspective CALD students are not given the cultural and contextual tools to respond to academic language when they are only given functional language tools to work with in a classroom setting. The teachers instruct within the cultural context they know, and assume the functional language knowledge of CALD students will provide the students with the capacity to interpret the academic language. CALD students, however, may not be able to make the cognitive leap the teacher requires when they are not given any scaffolded help to move above the functional language level. When CALD students and the teacher function at different levels of language use, the potential to decode meaning is limited (Blank & White, 1999). The results of Study 1 and Study 2 suggest that students and teachers are placed in a precarious position given the incongruence of the tools they have to function with. This notion of incongruity led to the development of Study 3, an intervention study to identify ways in which CALD students might be better supported through appropriate language use in Australian TAFE classrooms.

Research Question 3: Does incorporating dialogue strategies enhance the learning of adult students where English is not their first language?

Looking back to Study 1 it was shown that at the problem-solving level CALD students were not able to endorse the utility of their preferred problem-solving approach in

a TAFE classroom. Study 2 showed that teachers perceived CALD students as not being able to apply abstract processing to tasks. Study 3 focussed on the benefits of an intervention strategy that was based on Vygotskian approaches to language and context.

The indications from this research are that difficulties CALD students had in understanding instructions are more transient, situational, and language induced than truly cognitive. Once teachers adapted their instruction to interact more meaningfully with the students, the students' inability to operate at the higher levels of problem solving was reduced. The advantage of using Blank's (2002) Levels of Questions approach was that it gave the TAFE teachers a way to organise their oral and written instruction. This is not the only research study that has identified this finding, with Houghton and Bain (1993) and Mercer and Littleton (2007) also noting that if teachers adapted their pedagogy to better match the language level of their students, and organised their material in a logical and transparent manner, their students were better able to deal with more abstract reasoning tasks and more linguistically complex material. Hick (1998) pointed out that conceptually a communication is half owned by the speaker and half owned by the receiver of the utterances, and it is thus important from a teaching perspective to deliver the content in as clear and as organised a way as possible to the receiver by explaining the meaning of words and the context of the information.

The main and important finding of Study 3 was that Vygotsky's (1978) social learning theory, as developed and interpreted by Blank (2002), has application for the successful teaching and learning of adult students who are also second language learners. This is also, to date, the first reported evidence-based study that validates that Blank's (2002) dialogue framework can enhance the learning outcomes of adults. In particular the results are supportive of Culatta et al. (2010) who maintained that teachers' questions can build on students' level of prior knowledge and assist the students to organise their thinking about the information presented. They also asserted that teachers' questions motivated students to be more engaged in their own learning and by using different levels of discussion and reasoning questions, the teacher could advance their students' thinking and hence their responses to those questions. Blank's (2002) levels of dialogue strategy identifies different contexts in which problem-solving can be perceived by the individual. From this vantage point although level one language learning of vocabulary and grammar is important, the application of language levels two, three, and four to learning introduces

learners to higher order levels of problem-solving. The move up the levels scaffolds higher-order thinking.

The findings from Study 3, further validate the reported association between individuals' language development, their reasoning ability, and their social and academic success in educational settings (Catts & Kamhi, 2005; Hay et al., 2007). In addition, the findings make a contribution to the notion that appropriate ongoing and supplemented language, learning, and reasoning experiences may act as protective factors that can have a positive influence upon individuals' cognitive and social development and so help alleviate low educational achievement (Enfield & Levinson, 2006; Paul, 2007; Wertsch, 2008).

The findings also support the theoretical positions that:

A person's language, thinking, and comprehension development are linked with parts of a person's cognitive development, which is the basis for Vygotsky's (1978) social learning theory; and

An individual's language and vocabulary competencies underpin the person's transition into comprehension of instruction, information processing, and reasoning (Mercer & Littleton, 2007).

In this study, TAFE teachers' knowledge about how to adapt their pedagogical skills to improve students' learning were enhanced when they adapted their levels of questioning within a sequential and cognitive framework. This framework progressed from knowing the vocabulary and the concepts to organising these words and concepts within an increasingly more complex reasoning structure. The TAFE teachers who applied Blank's level of dialogue questions were better able to operate within their adult students' Zone of Proximal Development (ZPD). The findings also support the idea that vocabulary development takes place alongside cognitive and semantic (meaning) framework (Goswami & Bryant, 2007).

Based on the teachers' comments about the use of Blank's (2002) approach in their classrooms two observations emerged. First, when provided with opportunities to discuss ideas using a socio-cultural, structured approach, students developed an understanding of words and concepts they were not clear about before. Second, students developed greater confidence in being able to ask questions, which two of the teachers suggested was not commonplace in their experience before the intervention.

The CALD students whose teachers participated in the intervention appeared to have developed not only an increased vocabulary and improved understanding of the context of their study, but also better higher-order reasoning skills about that content. They began to engage in dialogue within the classroom, and to ask pertinent questions about the content. From a socio-cultural perspective, they used Blank's (2002) question levels as a scaffold to develop from knowing only the vocabulary, to an understanding of the concepts, and to how to apply those concepts in the context of their study. Because the teachers initially focussed on the vocabulary and the underlying concepts (Blank, 2002), Level 1 and Level 2 type interactions the students were able to better understand the content, rather than being confused by abstract reasoning introduced before the foundation concepts were understood. In the context of disability studies, for example, asking a student how to modify a dwelling for a person with cerebral palsy assumes that the student has an understanding of the terms "cerebral palsy" and the concept of modification. Ensuring that the vocabulary and concepts associated with that language are well understood before introducing the problem-solving aspect of modifying a dwelling allowed the students to focus on the problem rather than decoding the terminology. From Blank's perspective and Vygotsky's (1978) inner-speech notion, the teacher supported the students' learning by making the vocabulary and concepts meaningful. Hence the students better understood the ideas and were able to relate their new learning to other existing concepts and vocabulary, enhancing the students' working memory (Baddeley, 2007).

Having TAFE teachers better organise the information presented to their CALD students may have indirectly assisted the students cope with the additional cognitive memory load that has been identified when students have to process information in a second language context (Lantolf, 2006; Ramburuth & Tani, 2009). Such a finding, in part, shifts the arguments away from the CALD students having a deficit in their cognitive processing or their higher order thinking ability, and places it in the context that CALD students are inexperienced linguistically in an Australian TAFE learning context. From this perspective the need is to facilitate the learning environment for the students to more effectively accommodate the students' current levels of understanding. Accommodations and adjustments need to be made by both the TAFE teachers and the CALD students. Lester (2011) has argued that these accommodations and adjustments require western thinking teachers to review what and how they present to their students from other cultures. For example, more small group work, more assessment tasks that do not require significant

amounts of writing, more visual information than verbal information, more opportunities to work on problems that are relevant to the students when they go back to their home county, and greater recognition of the students' customs and beliefs, such as not setting classes on Friday and having prayer rooms for students contribute to improved learning. One advantage of making these accommodations and adjustments is that CALD students who come from different countries and language groups are more likely to perceive that they are valued and listened to and this perception of being valued enhances their motivation and self-identity as students (Cardelle-Elawar, Irwin, & De Acedo Lizarraga, 2007; Nickerson, 1999).

The teachers observed that students engaged in classroom activities, such as asking questions, differently from what teachers had previously observed. Students were reported to be asking questions of teachers about topics that were studied, and students also observed that they were more confident about their study experience. As Blank and White (1999) reported, when questions are asked that allowed each student's Zone of Proximal Development (ZPD) to be supported then the students are given the opportunity to incorporate learning into long-term memory. Blank and White argued that in a classroom there is diversity of student ability and understanding and so there is also diversity in the students' ZPD's with each student having an individual ZPD. In this context the use of Blank's (2002) Levels of Questioning supports all students by scaffolding learning through the use of the four different levels allowing for differences in each student's ZPD as the learning takes place. In his seminal work, Bandura (1977) argued that self-efficacy had an influence on the potential of a person to be successful at a given task. Vadeboncoeur (2013) has linked affective, cognitive, situational and personal contexts as units of analysis within socio-cultural theory that are able to be analysed within the ZPD. In this context the ZPD not only incorporates learning potential, but also the self-efficacy of a person participating in an activity, due to the person being able to participate successfully in the activity and to undertake problem-solving tasks. The observations showed that students changed their understanding of the pragmatics of the classroom and improved their efficacy as learners in an Australian adult educational setting. As a result of the intervention, the CALD students became less passive about their learning. For example, they asked more questions and enquired in meaningful ways about their assignments. Such behaviour is commonplace in Australian classrooms, but is unusual in the Asian classrooms from which most of these students came. These modifications to the students' behaviours indicate that

they were developing more confidence and were better able to assume the practices and expectations of an Australian classroom setting. Neither the teachers nor the content of the course had changed, and the students were similar to previous groups, it seems likely that the Vygotskian language-based intervention, consciously implemented by their teachers, helped these students to develop as learners in the Australian educational setting.

Such a finding is in line with that of De Leon (2012) who stated that students' higher-order thinking is developed as the meaning of language is negotiated by the students. The finding are also supportive of Cornoldi, Drusi, Tencati, Giofre and Mirandola (2012) who argued that when the teachers' language of instruction (involving the how, when, where and why of instruction) can be organised, this facilitates students' learning which also needs organising by the student to be effective.

Vygotsky's (1978) notion that students' Zone of Proximal Development (ZPD) is the place where teachers must operate to enhance their students' learning has been explored in education for some time (e.g., Goswami & Bryant, 2007; Guk & Kellogg, 2007). The evidence from this study is that teachers who utilised the Blank (2002) dialogue strategies in their TAFE classroom helped to close the gap between the CALD students' understanding of, and their TAFE teachers' delivery of specific content to their students. They were operating at their students' ZPD.

Levykl (2008) and Simsek (2011) claimed that teachers, who address the ZPD for their students, indirectly and directly enhance their students' mastery of the content but also build the students' self-efficacy as learners. This development of students' self-efficacy seems to have a positive and significant long-term influence on the students' future learning and engagement with schooling (Caprara, Vecchione, Alessandri, Gerbino, & Barbaranelli, 2011). There is support for this viewpoint from the observations made by one TAFE teacher, Rita, regarding changes in her students. Rita reported that many of the CALD students in her class changed in their thinking, but they also changed in their confidence and willingness to participate and engage in the activities in the classroom. Rita specifically commented on one of the CALD students who turned from being an 'at risk' of passing to becoming one of the top students in her class. The student displayed changes in her potential to engage in and to participate in a meaningful way with the classroom activities.

There is some criticism that students' academic performance is reduced in classrooms where teachers fail to monitor their students' responses to a task and teachers do not adapt and shape their teaching to accommodate their students' performances (Hattie, 2009). In many classrooms the language and dialogue interactions between teacher and students fail to enhance students' reasoning and thinking skills (Nuthall, 2005). In these classrooms, questioning becomes ritualised, and students respond as a group in ways that does not stimulate increased engagement. The students' take on appropriate behaviours but in reality are not engaged cognitively. Prior to the intervention, teachers were commenting that the CALD students did not seem to be engaged.

In contrast, the type of teaching advocated by Vygotsky (1978) and Blank (2002), involves teachers in constantly monitoring their own questions and feedback, and making their interactions with all of their students more meaningful to shape an individual student's learning and reasoning. Errors, in a Vygotskian classroom, become pointers to students' misconceptions, providing a basis for constructive dialogue with the individual student, rather than being seen as "incorrect" in the ritualised classroom described by Nuthall (2005). Each student is thus provided with a pathway to reflection about the content, and enhancement of understanding of the concept, word, or context that the teacher's question addresses. In these ways, the teacher can begin and shape the discussion to enable the student to answer at a higher, and more appropriate, level of linguistic complexity. Following an intervention constructed from this Vygotskian perspective, students' classroom behaviours changed and the learning outcomes were more successful.

Limitations

As with all studies, this research was bounded in a particular time and place. It was limited by the context of the two TAFE colleges within which all three studies were conducted. These were very large institutions that can be considered to be typical of similar organisations in other cities. Nevertheless, the findings need to be replicated with other CALD groups from different cultures, over a longer period of time, and with control groups to provide more control of the experimental situation.

In addition, each study in this research was a single cross sectional study. Taking a longitudinal approach to investigating the use of Blank's (2002) Levels of Questioning would enhance the knowledge of this approach across time. It would also be useful to have a follow-up investigation of students' education to determine the transfer effect of this

intervention. Finally, it would also be of value to have teachers receive a more intensive training in the use of Blank's Levels of Questioning prior to any intervention to avoid the difficulties Agnes reported. In this study, time constraints did not allow for more than a brief introduction.

Conclusion

The findings from the three studies showed a pattern of response as follows. In Study 1 it was found that CALD students had difficulties endorsing the effectiveness of their preferred problem-solving approach in an Australian educational setting and this was particularly evident when combined with the students' preferred approach to study, which was collectivist. It was also shown that experience of another culture, before being exposed to an Australian educational culture assisted students' perceptions of themselves as problem-solvers in an Australian educational context. Study 2 indicated that teachers perceived that CALD students were not readily able to use abstract approaches to problem-solving that were taught in class, and which the students were expected to use to solve-problems. The two studies taken together suggested that there was incongruence between the approach students used to problem-solve and the teachers expectations of CALD students as problem-solvers. These results also indicated that there are cultural differences in problem-solving that are particularly related to higher order problem-solving as it relates to educational settings. The results are also consistent with the socio-cultural theory hypothesis that higher-order thinking is influenced by education that is culturally bound. In Study 3 it was shown that by scaffolding the development of higher -order thinking through a supportive dialogue process helped these CALD students to bridge the gap between the teachers' use of terms and concepts and the students' understanding and use of those terms. TAFE teachers introduced Blank's (2002) Levels of Questioning framework into their regular program and this enhanced their teaching, and their students' learning. These findings are in accordance with Vygotsky's (1978) social learning theory in the context of adult second language learners, and strengthen the argument that there are robust, interactive links between individuals' language development, their cognitive reasoning, and their educational success. These associations appear to be best facilitated within a learning environment where the dialogue between the teacher and the student is meaningful, planned, and encouraged, even when that learning environment is in a different cultural context, as in this study.

The outcomes of this study have implications for the ways in which classrooms engage in teaching, and even how professional learning can be developed. This research has drawn from many different areas of psychology and education but at the core indicates that Australian TAFE teachers need to have a better understanding of the learning needs of students who come from different cultural and language backgrounds. The results of the study support the inclusion of Blank's (2002) Levels of Questioning into the training of TAFE teachers, and that TAFE teachers should adopt pedagogical strategies, based on interactive dialogue, that have been demonstrated to be effective to assist CALD students achieve their potential.

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Appendices

Appendix A	Ethics information relating to Study 1 and Study 2
Appendix B	Instruments used in Study 1 and Study 2
Appendix C	Ethics information relating to Study 3
Appendix D	Instruments used in Study 3

Appendix A

Information for Participants Study 1

Information for Participants Study 2

Dr. J Connelly and Dr. R Callingham
Mr. Frederick Wright (doctoral student).

Project Title: Evaluating the significance of culture in developing metacognitive knowledge of adult learners.

Information sheet for participants.

Introduction:

You are invited to participate in the above research project, which is being done by Dr Jan Connelly, Dr Rosemary Callingham and (doctoral candidate) Frederick Wright of the Education Faculty. This project will make up part of Mr. Wright's doctoral thesis, and has been approved by the Human Research Ethics Committee.

The project has two stages: The aim of the first stage of the project is to investigate how cultural differences might influence thinking about how to do a task. In this part, if you choose to participate, you would be asked to complete three questionnaires. If you participated in the first part of the project you would not be asked to participate in the second stage.

In the second stage of the project, if you choose to participate, you would be asked to work with the researcher for eight weeks.

It is important to note that the participant is free to withdraw consent and to discontinue participation in the activity at any time without prejudice.

What will you be asked to do?

In stage one of the project you will be asked to fill out three questionnaires and return them to the researcher in a self addressed envelope that will be provided. This should take approximately half an hour to do.

In stage two of the project a small number of people will be asked to keep a journal for eight weeks. The journal will be about your learning experiences only. This would take you approximately half an hour per week. You would also be asked to meet with the researcher on two occasions for approximately one hour in total. The firstly meeting would be before starting the journal and the second meeting at the end of the project.

How will my confidentiality be protected?

We will protect your privacy and attempt to ensure that at all times no information is given out identifying any individual. No names will be used in any reports written about the study. Names and contact details will be kept in a secured file separate from any data collected. Any data that could be used to identify any individual will be removed. The data will be stored securely in a locked filing cabinet for five years from the date of publication, before being destroyed.

How will I receive feedback?

A brief summary of the findings will be available to you on application at the Faculty of Education.

Will participation prejudice me in any way?

Participation in this study is completely voluntary. If you wish to withdraw at any stage, or to withdraw any unprocessed data you have supplied, you are free to do so without prejudice.

Where can I get further information?

Should you require any further information, or have any concerns, please do not hesitate to contact any of the researchers on the number given above. Should you have any concerns about the conduct of the project, you are welcome to contact the; Research Service, The University of New England, Armidale NSW, 2351 (Phone: 02 – 6773 3449, fax : 02 – 6773 3543).

What if I am concerned?

Free counselling services are provided by the Institute that you study at, if at any time, any matter about the project were of concern to you. These services would be provided free of any contact with the researcher. The service is totally confidential and provided by the Student Services Department Holmesglen (phone 9564-1649) or Student Services Box Hill Institute (phone = 9286 9891). These services are provided for students of the Institute, you would not be able to receive counselling through the University of New England counselling service.

How do I agree to participate?

If you wish to participate in the project could you please sign the accompanying consent form.

Thank you very much for your time.

Frederick Wright.

Dr J. Connelly and Dr. R. Callingham (Supervisors)
Frederick Wright (Doctorial Candidate).

Consent form for persons participating in stage one of the research project.

Project title: Evaluating the significance of culture on the development of metacognitive knowledge of adult learners.

- 1) I agree to participate in the project named above. I am aware that the study will involve me filling out three questionnaires about how I think through solving a problem and my preferred ways of learning.

A written copy of the Information Sheet for Participants has been given to me to keep.

- 2) I acknowledge that:
- a) The study will involve me thinking about my learning and could raise some personal issues for me;
 - b) I have been informed that I am free to withdraw from the project at any time without explanation or prejudice and withdraw any unprocessed data previously supplied;
 - c) The project is for educational purposes;
 - d) I have been informed that the confidentiality of the information that is provided by me will be safely guarded subject to any legal requirements.

I have read the information contained in the Information Sheet for Participants and any questions I have asked have been answered to my satisfaction. I agree to participate in this activity, realising that I may withdraw at any time. I agree that research data gathered for the study may be published, provided my name is not used.

Signature.....Date.....



Developing second language abstract thinking in a population with English as a Second Language (ESL) background.

Supervisors: Professor. I. Hay and Assoc. Prof. R Callingham
Researcher: Mr. Frederick Wright (doctoral student).

Invitation

You are invited to participate in a research study into ways in which TAFE students who use English as a second language can be helped to develop improved responses to complex questions asked in their classrooms. The study is being conducted by Frederick Wright with supervisors Professor. I. Hay and Assoc. Prof. R Callingham from the Faculty of Education at the University of Tasmania. This project will form part of Fred Wright's doctoral thesis.

I am writing to invite you to participate in the study.

The aim of the study

The aim of this project is to develop a better understanding of students who speak English as a Second Language (ESL) and then examine an intervention approach to assist these students at the class levels.

In this part of my study I am investigating the difficulties and advantages TAFE lecturers/teachers' believe are experienced by ESL students in mainstream classrooms and the difficulties and advantages TAFE teachers/lecturers experience in teaching this cohort of students. Some TAFE teachers/lecturers may also be approached to participate in the intervention. A second permission form will be available to those TAFE lecturers/teachers who participate in the intervention.

'Why have I been invited to participate in this study?'

You are eligible to participate in this study because you are a teacher in the TAFE sector who currently teaches students who use English as a second language.

'What does the study involve?'

If you choose to participate you will be asked to fill out the attached questionnaire and return it to the researcher via the self addressed envelope provided, together with a consent form which will be placed in a separate sealed envelope. The questionnaire should take approximately 30 minutes to complete. You may choose to withdraw consent to participate in the study at any time without prejudice. No identifying information is collected in this part of the study. No individual, nor the TAFE institute, will be identified in any publication arising from the study.

It is important that you understand that your involvement in this study is voluntary. While we would be pleased to have you participate, we respect your right to decline. There will be no consequences to you if you decide not to participate, and this will not affect your treatment / service. If you decide to discontinue participation at any time, you may do so without providing an explanation. All information will be treated in a confidential manner, and your name will not be used in any publication arising out of the research. All of the research will be kept in a locked cabinet in the office of Fred Wright. At the end of the study, the data will be transferred and

Information for TAFE lecturers/Teachers

stored securely in a locked filing cabinet or in password protected files for 5 years in the Faculty of Education and the University of Tasmania, after which time it will be destroyed.

‘Are there any possible benefits from participation in this study?’

The study is of potential interest to all people who teach students who come from a language background other than English. It will provide advice to such teachers about approaches to teaching that appear to help such students.

When the study is completed a report of the findings will be circulated to all teachers at this TAFE institute who teach students with English as a Second Language.

‘Are there any possible risks from participation in this study?’

There are no specific risks anticipated with participation in this study.

‘What if I have questions about this research?’

If you would like to discuss any aspect of this study please feel free to contact any of the researchers: Professor Ian Hay (03 6324 3144 or email: Education.Dean@utas.edu.au), Doctor Rosemary Callingham (03 6324 3051 or email Rosemary.Callingham@utas.edu.au), or Mr Fred Wright ((work) 03 9564 1617 or email fred_wr@holmesglen.vic.edu.au).

Any of us would be happy to discuss any aspect of the research with you. You are welcome to contact us at that time to discuss any issue relating to the research study.

This study has been approved by the Tasmanian Social Science Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study should contact the Executive Officer of the HREC (Tasmania) Network on (03) 6226 7479 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. You will need to quote H11466.

Thank you for taking the time to consider this study.

If you wish to take part in it, please sign the attached consent form.

This information sheet is for you to keep.

Thank you for your time and assistance.

Kind regards



Fred Wright

Ian Hay

Rosemary Callingham

LETTERHEAD

STATEMENT OF INFORMED CONSENT FOR TEACHERS

Developing second language abstract thinking in a population with English as a
Second Language (ESL) background.

1. I have read and understood the 'Information Sheet' for this project.
2. The nature and possible effects of the study have been explained to me.
3. I understand that the study will require me to complete a questionnaire, taking no longer than 30 minutes.
4. I understand that participation involves no particular the risk.
4. I understand that all research data will be securely stored on the University of Tasmania premises for five years, and will then be destroyed.
5. I agree that research data gathered for the study may be published provided that I cannot be identified as a participant.
6. I understand that the researchers will maintain all participants' identities as confidential and that any information supplied to the researchers will be used only for the purposes of the research.
7. I agree to participate in this study and understand that I may withdraw at any time without any consequence and, if I so wish, may request that any data that I have supplied to date be withdrawn from the research.
8. Any questions that I have asked have been answered to my satisfaction.

Teacher:

Signature:

Date:

Statement by Investigator

- ☐ I have explained the project and the implications of participation it to the teacher and I believe that the consent is informed and that he/she understands the implications of participation.

If the Investigator has not had an opportunity to talk to the class teacher prior to them participating, the following must be ticked.

- ☐ The teacher has received the Information Sheet where my details have been provided so the teacher has the opportunity to contact me prior to consenting to participate in this project.

Name of Investigator

Appendix B

Demographic information

Preferred Learning Style Questionnaire (PLSQ)

Preferred Way of Problem Solving Questionnaire (PWPS)

Personal information.

This information will be totally confidential.

No personal details will be kept with the other data.

No identifying details will be used in any written work resulting from the study.

Would you please fill out the following details:

1. What is your country of origin.....
2. Have you ever lived in a country other than Australia or your home country?
Yes No (if no please go on to Q 5)
3. How many other countries have you lived in?
(Please circle one) 1 2 3 4 5 more
4. If you have lived in another country before, how long did you live there for?
(Choose the country where you spent the most time, but not your home country.)
Please circle one of the following:
1 to 3 months 3 to 6 months 6 to 12 months
12 month to 2 years 2 years or more
5. Would you describe yourself as having a lot of experience of other cultures?
(Please circle one) Yes No
6. Which age range would you describe yourself as fitting into?
(Please circle one).
Less than 20 years 20 – 30 years 30 – 40 years 40 – 50 years
50 – 60 years 60 – 70 years

Thank you for taking the time to fill out these details.

Preferred learning style questionnaire

This questionnaire asks you to rate the way you like to learn things.

Please imagine you are in a new learning situation before starting to answer the questions. You have been asked by the teacher to cooperate with a group of fellow students on a project.

Please keep the situation stated above in mind when answering the questions.

Circle 1 (most agree) to 4 (least agree).

Questions:

	Strongly agree			Strongly disagree
1 I like to do class work by myself.	1	2	3	4
2 When I am successful in my learning it is because of my efforts.	1	2	3	4
3 I enjoy doing tasks differently from other people.	1	2	3	4
4 I like my privacy when studying.	1	2	3	4
5 When people in the group do better than me I need to work harder.	1	2	3	4
6 Competition between classmates is good for the group	1	2	3	4
7 It is important to me to be the top of the group.	1	2	3	4
8 Competition makes me work harder.	1	2	3	4
9 am proud when members of my class get good results.	1	2	3	4
10 Harmony is very important when you are learning.	1	2	3	4
11 I like to share things with my classmates.	1	2	3	4
12 When doing a group activity I assist others as much as reasonably possible.	1	2	3	4
13 I think the group needs come first.	1	2	3	4
14 I hate disagreeing with others in the group.	1	2	3	4
15 I think I should consider group needs over mine.	1	2	3	4
16 I should consult with the group before doing a task.	1	2	3	4

Thank you very much for your time

Adapted from Hornik & Tupchiy (2007)

Preferred way of problem solving

This questionnaire asks you to think about the approach that is most often used by you when asked to solve a problem. It also asks you to think about how often you use that problem solving approach with interpersonal, practical and study problems.

Could you please imagine that you are in a situation in which your teacher has asked to cooperate with a group of fellow students on a project. Keeping this in mind which strategy would you most encourage the group to use when solving the problem and how often would you use the preferred strategy in interpersonal, practical and study related problem solving?

- 1) Which of the following mental strategies do you think you would encourage a group to use when working on a task? (please tick the most appropriate response).

Creativity () Speed () Critical Thinking () Synthesis ()

Accuracy () Memory () Analysis () Logical Thinking ()

- 2) Think about the application of this strategy to interpersonal problems:

	Not a lot			Very often
How often would you use the strategy	1	2	3	4
How useful do you think the strategy is?	1	2	3	4
How easy do you think the strategy is to apply	1	2	3	4

- 3) Think about the application of the strategy to practical problems:

How often would you use the strategy	1	2	3	4
How useful do you think the strategy is	1	2	3	4
How easy do you think the strategy is to apply	1	2	3	4

- 4) Think about the application of the strategy to study problems:

How often would you use the strategy	1	2	3	4
How useful do you think the strategy is	1	2	3	4
How easy do you think the strategy is to apply	1	2	3	4

Appendix C

Information for Participants Study 3

Developing second language abstract thinking in a population with English as a Second Language (ESL) background.

Supervisors: Professor. I. Hay and Assoc. Prof. R Callingham

Researcher: Mr. Frederick Wright (doctoral student).

Invitation

You are invited to participate in a research study into ways in which TAFE students who use English as a second language can be helped to develop improved responses to complex questions asked in their classrooms. The study is being conducted by Frederick Wright with supervisors Professor. I. Hay and Assoc. Prof. R Callingham from the Faculty of Education at the University of Tasmania. This project will form part of Fred Wright's doctoral thesis.

I am writing to invite you to participate in the study.

The aim of the study

The aim of this project is to develop a better understanding of students who speak English as a Second Language (ESL) and then examine an intervention approach to assist these students at the class levels.

In this part of my study I am investigating the difficulties and advantages TAFE lecturers/teachers' believe are experienced by ESL students in mainstream classrooms and the difficulties and advantages TAFE teachers/lecturers experience in teaching this cohort of students. Some TAFE teachers/lecturers may also be approached to participate in the intervention. A second permission form will be available to those TAFE lecturers/teachers who participate in the intervention.

'Why have I been invited to participate in this study?'

You are eligible to participate in this study because you are a teacher in the TAFE sector who currently teaches students who use English as a second language.

'What does the study involve?'

If you choose to participate you will be asked to fill out the attached questionnaire and return it to the researcher via the self addressed envelope provided, together with a consent form which will be placed in a separate sealed envelope. The questionnaire should take approximately 30 minutes to complete. You may choose to withdraw consent to participate in the study at any time without prejudice. No identifying information is collected in this part of the study. No individual, nor the TAFE institute, will be identified in any publication arising from the study.

It is important that you understand that your involvement in this study is voluntary. While we would be pleased to have you participate, we respect your right to decline. There will be no consequences to you if you decide not to participate, and this will not affect your treatment / service. If you decide to discontinue participation at any time, you may do so without providing an explanation. All information will be treated in a confidential manner, and your name will not be used in any publication arising out of the research. All of the research will be kept in a locked cabinet in the office of Fred Wright. At the end of the study, the data will be transferred and stored securely in a locked filing cabinet or in password protected files for 5 years in the Faculty of Education and the University of Tasmania, after which time it will be destroyed.

‘Are there any possible benefits from participation in this study?’

The study is of potential interest to all people who teach students who come from a language background other than English. It will provide advice to such teachers about approaches to teaching that appear to help such students.

When the study is completed a report of the findings will be circulated to all teachers at this TAFE institute who teach students with English as a Second Language.

‘Are there any possible risks from participation in this study?’

There are no specific risks anticipated with participation in this study.

‘What if I have questions about this research?’

If you would like to discuss any aspect of this study please feel free to contact any of the researchers: Professor Ian Hay (03 6324 3144 or email: Education.Dean@utas.edu.au), Doctor Rosemary Callingham (03 6324 3051 or email Rosemary.Callingham@utas.edu.au), or Mr Fred Wright ((work) 03 9564 1617 or email fred_wr@holmesglen.vic.edu.au).

Any of us would be happy to discuss any aspect of the research with you. You are welcome to contact us at that time to discuss any issue relating to the research study.

This study has been approved by the Tasmanian Social Science Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study should contact the Executive Officer of the HREC (Tasmania) Network on (03) 6226 7479 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. You will need to quote H11466.

Thank you for taking the time to consider this study.

If you wish to take part in it, please sign the attached consent form.

This information sheet is for you to keep.

Kind regards



Fred Wright

Ian Hay

Rosemary Callingham

STATEMENT OF INFORMED CONSENT FOR TEACHERS

Developing second language abstract thinking in a population with English as a Second Language (ESL) background.

1. I have read and understood the 'Information Sheet' for this project.
2. The nature and possible effects of the study have been explained to me.
3. I understand that the study will require me to complete a questionnaire, taking no longer than 30 minutes.
4. I understand that participation involves no particular the risk.
5. I understand that all research data will be securely stored on the University of Tasmania premises for five years, and will then be destroyed.
6. I agree that research data gathered for the study may be published provided that I cannot be identified as a participant.
7. I understand that the researchers will maintain all participants' identities as confidential and that any information supplied to the researchers will be used only for the purposes of the research.
8. I agree to participate in this study and understand that I may withdraw at any time without any consequence and, if I so wish, may request that any data that I have supplied to date be withdrawn from the research.
9. Any questions that I have asked have been answered to my satisfaction.

Teacher:

Signature:

Date:

Statement by Investigator

- ☐ I have explained the project and the implications of participation it to the teacher and I believe that the consent is informed and that he/she understands the implications of participation.

If the Investigator has not had an opportunity to talk to the class teacher prior to them participating, the following must be ticked.

- ☐ The teacher has received the Information Sheet where my details have been provided so the teacher has the opportunity to contact me prior to consenting to participate in this project.

Name of Investigator

Developing second language abstract thinking in a population with English as a Second Language (ESL) background

Supervisors: Professor. I. Hay and Assoc. Prof. R Callingham

Researcher: Mr. Frederick Wright (doctoral student).

Invitation

You are invited to participate in a research study into ways in which TAFE students who use English as a second language can be helped to develop improved responses to complex questions asked in their classrooms. The study is being conducted by Frederick Wright with supervisors Professor. I. Hay and Assoc. Prof. R Callingham from the Faculty of Education at the University of Tasmania. This project will form part of Fred Wright's doctoral thesis.

I am writing to invite you to participate in the study.

The aim of the study

The aim of this project is to develop a better understanding of students who speak English as a Second Language (ESL) and then examine an intervention approach to assist these students at the class levels.

The language focused intervention uses a hierarchy of questioning that progresses from descriptive, to comparison, to organisational, and then to more abstract questions. This procedure has been demonstrated to be effective in the primary and secondary school sectors but its application to the TAFE sector or TAFE students with as ESL background is the focus of this study.

'Why have I been invited to participate in this study?'

You are eligible to participate in this study because you are a teacher in the TAFE sector who currently teaches students who use English as a second language.

'What does the study involve?'

This part of the study will involve 6 volunteer TAFE teachers who teach students from an ESL background over their regular program of 12 weeks. The outcome measure will be the TAFE teachers' and the TAFE students' reactions to the inclusion of the hierarchical questioning procedure into their program.

The researchers will run 6 workshops of two hours duration per workshop on the use of a hierarchy of questioning procedure for participating TAFE teachers. The first two workshops will run before the start of semester, the second set, three weeks into the semester and then the third set of two workshops three weeks later (six weeks) into semester. The first workshops will be conducted by Professor Ian Hay from the University of Tasmania who is a specialist in working with students with higher order language issues. He will also consult with the TAFE teachers while they are implementing the intervention.

Prior to the start of the semester and at the end of the semester, participating TAFE teachers will be asked to complete a survey about their recent teaching of TAFE students who have an ESL background.

The participating TAFE teachers will be asked to keep a weekly journal on how they progress their use of the questioning activities and the students' learning. This journal activity is likely to be about 500 words per week.

You may choose to withdraw consent to participate in the study at any time without prejudice. No identifying information is collected in this part of the study. No individual, nor the TAFE institute, will be identified in any publication arising from the study.

It is important that you understand that your involvement in this study is voluntary. While we would be pleased to have you participate, we respect your right to decline. There will be no consequences to you if you decide not to participate. If you decide to discontinue participation at any time, you may do so without providing an explanation. All information will be treated in a confidential manner, and your name will not be used in any publication arising out of the research. All of the research will be kept in a locked cabinet in the office of Fred Wright. At the end of the study, the data will be transferred and stored securely in a locked filing cabinet or in password protected files for 5 years in the Faculty of Education and the University of Tasmania, after which time it will be destroyed.

‘How will I receive feedback?’

As part of participation in the workshop you will be given mentoring and support associated with the intervention. Once the findings from this research have been completed, a summary will be available to you via email. A report from the study will also be circulated to all teachers in TAFE when the study is completed.

‘Are there any possible benefits from participation in this study?’

The study is of potential interest to all people who teach students who come from a language background other than English. It will provide advice to such teachers about approaches to teaching that appear to help such students. For those teachers who participate in this intervention stage, the professional learning aspects will be of benefit beyond the study parameters.

When the study is completed a report of the findings will be circulated to all teachers at this TAFE institute who teach students with English as a Second Language.

‘Are there any possible risks from participation in this study?’

There are no specific risks anticipated with participation in this study.

‘What if I have questions about this research?’

If you would like to discuss any aspect of this study please feel free to contact any of the researchers: Professor Ian Hay (03 6324 3144 or email: Education.Dean@utas.edu.au), Doctor Rosemary Callingham (03 6324 3051 or email Rosemary.Callingham@utas.edu.au), or Mr Fred Wright (work) 03 9564 1617) or email fred_wr@holmesglen.vic.edu.au).

Any of us would be happy to discuss any aspect of the research with you. You are welcome to contact us at that time to discuss any issue relating to the research study.

This study has been approved by the Tasmanian Social Science Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study should contact the Executive Officer of the HREC (Tasmania) Network on (03) 6226 7479 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. You will need to quote H11466.

Thank you for taking the time to consider this study.

If you wish to take part in it, please sign the attached consent form.

This information sheet is for you to keep.

Thank you for your time and assistance.

Kind regards



Fred Wright

Ian Hay

Rosemary Callingham

**STATEMENT OF INFORMED CONSENT FOR TEACHERS
PARTICIPATING IN THE INTERVENTION**

Developing second language abstract thinking in a population with English as
a Second Language (ESL) background.

1. I have read and understood the 'Information Sheet' for this project.
2. The nature and possible effects of the study have been explained to me.
3. I understand that the study will require me to participate in a series of workshops, and to keep a journal of my experiences using the workshop ideas.
4. I understand that all research data will be securely stored on the University of Tasmania premises for five years, and will then be destroyed.
5. I agree that research data gathered for the study may be published provided that I cannot be identified as a participant.
6. I understand that the researchers will maintain all participants' identities as confidential and that any information supplied to the researchers will be used only for the purposes of the research.
7. I agree to participate in this study and understand that I may withdraw at any time without any consequence and, if I so wish, may request that any data that I have supplied to date be withdrawn from the research.
8. Any questions that I have asked have been answered to my satisfaction.

Teacher:

Signature:

Date:

Statement by Investigator

☐ I have explained the project and the implications of participation it to the teacher and I believe that the consent is informed and that he/she understands the implications of participation.

If the Investigator has not had an opportunity to talk to the class teacher prior to them participating, the following must be ticked.

☐ The teacher has received the Information Sheet where my details have been provided so the teacher has the opportunity to contact me prior to consenting to participate in this project.

Name of Investigator

Appendix D

Instruments for Study 3

Teacher Questionnaire.

We are seeking to find out your experience of teaching students whose first language is not English. The questionnaire is totally confidential. There is no right or wrong answers to questions we are interested in your perceptions of the teaching experience. The questionnaire will take approximately 10 minutes to complete.

Thank you for your time.

Example:

Would you please respond by circling the number which best describes your teaching experience with students whose first language is not English.

(One is very low and five is very high.)

How would you rate students you have taught whose second language is English on the following questions:

a) Students whose second language is English are able to follow instruction in English?

1 2 3 4 5
Very low Very high

b) Students whose second language is English can answer questions clearly?

Very low 1 2 3 4 5 Very high

Would you please respond by circling the number which best describes your teaching experience with students whose first language is not English.
(One being very low and five being very high.)

a) How good are they at providing descriptions of what they had seen?

b) How good are they at naming seen objects?

c) How good are at identifying differences between items?

d) How good were they at describing a scene?

e) How good are they at adapting information, based on classroom experience?

f) How good were they at following a set of directions?

g). How good were they at generalising information to new learning situations?

h) How good were they at identifying the causes of events?

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2) Are there any issues that you would like to raise?

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Thank you for taking the time to complete the questionnaire.

Fred Wright

Problem-solving Questionnaire

Listed below are some statements concerning approaches to solving problems.

Please mark your level of agreement with each statement.

1) When I solve problems in the classroom I usually

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	remember how I solved a similar problem in the past	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	just have a go at the first thing that comes to mind	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	think carefully about the logical steps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	break the problem down into small parts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	talk to my teacher about how to solve the problem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	talk to other students about how to solve the problem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	look for a similar problem in a book and copy it	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	leave it until my teacher shows me how to do it	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2) Listed below are some statements about how you found learning in your recent class.

Please mark your level of agreement with each statement.

In the class I have taken recently, I

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	found it easy to understand what the teacher wanted me to do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	usually understood what was expected of me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	found it easy to understand the ideas that were taught	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	enjoyed my learning experience in this class	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	liked the way that the teacher asked questions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	contributed to classroom discussions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	asked questions of the teacher about the material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Feel more confident when I understand what I am doing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Information sheet for TAFE students

could be used to identify any individual will be removed. The data will be stored securely in a locked filing cabinet or in password protected files at the University of Tasmania for 5 years, after which time it will be destroyed.

Your teacher will receive a summary report of the findings once the data are analysed, and you may also request a copy of the report from the researcher.

You may choose to withdraw consent to participate in the study at any time without prejudice. No identifying information is collected in this part of the study. No individual, nor the TAFE institute, will be identified in any publication arising from the study.

It is important that you understand that your involvement in this study is voluntary. While we would be pleased to have you participate, we respect your right to decline. There will be no consequences to you if you decide not to participate, and this will not affect your assessment or results in any course. If you decide to discontinue participation at any time, you may do so without providing an explanation. All information will be treated in a confidential manner, and your name will not be used in any publication arising out of the research. All of the research will be kept in a locked cabinet in the office of Fred Wright. At the end of the study, the data will be transferred and stored securely in a locked filing cabinet or in password protected files for 5 years in the Faculty of Education and the University of Tasmania, after which time it will be destroyed.

‘Are there any possible benefits from participation in this study?’

The study is likely to help you with your course by helping you to understand better the information that you are learning.

‘Are there any possible risks from participation in this study?’

There are no specific risks anticipated with participation in this study.

‘What if I have questions about this research?’

If you would like to discuss any aspect of this study please feel free to contact any of the researchers: Professor Ian Hay (03 6324 3144 or email: Education.Dean@utas.edu.au), Doctor Rosemary Callingham (03 6324 3051 or email Rosemary.Callingham@utas.edu.au), or Mr Fred Wright ((work) 03 9564 1617 or email fred_wr@holmesglen.vic.edu.au).

Any of us would be happy to discuss any aspect of the research with you. You are welcome to contact us at that time to discuss any issue relating to the research study.

This study has been approved by the Tasmanian Social Science Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study should contact the Executive Officer of the HREC (Tasmania) Network on (03) 6226 7479 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. You will need to quote H11466.

Thank you for taking the time to consider this study.

If you wish to take part in it, please sign the attached consent form.


This information sheet is for you to keep.

Thank you for your time and assistance.

Kind regards



Fred Wright



Ian Hay



Rosemary Callingham

STATEMENT OF INFORMED CONSENT FOR STUDENTS

Developing second language abstract thinking in a population with English as a Second Language (ESL) background.

1. I have read and understood the 'Information Sheet' for this project.
2. The nature and possible effects of the study have been explained to me.
3. I understand that the study will require me to complete a questionnaire, taking no longer than 30 minutes, at the start and end of a particular course.
4. I understand that all research data will be securely stored on the University of Tasmania premises for five years, and will then be destroyed.
5. I agree that research data gathered for the study may be published provided that I cannot be identified as a participant.
6. I understand that the researchers will maintain all participants' identities as confidential and that any information supplied to the researchers will be used only for the purposes of the research.
7. I agree to participate in this study and understand that I may withdraw at any time without any consequence and, if I so wish, may request that any data that I have supplied to date be withdrawn from the research.
8. Any questions that I have asked have been answered to my satisfaction.

Student: _____

Signature: _____

Date: _____

Statement by Investigator

☐ I have explained the project and the implications of participation it to the teacher and I believe that the consent is informed and that he/she understands the implications of participation.

If the Investigator has not had an opportunity to talk to the class teacher prior to them participating, the following must be ticked.

☐ The teacher has received the Information Sheet where my details have been provided so the teacher has the opportunity to contact me prior to consenting to participate in this project.

Name of Investigator _____

